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VOL. 5 NO. 2
FEBRUARY 1985

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- Personal Computers Are 10 Years Old!
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The character matrix offers – true descenders, near letter quality, emphasized, double strike, block graphics, and true proportional characters. You also get low, hi and ultra hi resolution bit image graphics.

The Radix readily fits your needs offering serial and parallel interfacing. You get a big 16K print buffer to keep your computer free for your other important tasks.

The Radix also shows versatility with an automatic sheet feeder for your letterhead and a short form tear-off for pre-printed forms.

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Are you someone that needs those spreadsheets printed yesterday? Then the Delta line is for you with a print speed of 160 CPS, bi-directional printing and software controlled switching from 80 column printing to 132 column condensed.

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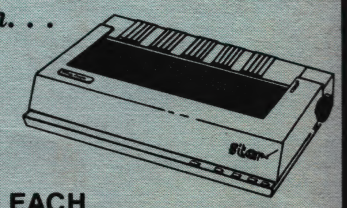

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For crisp executive quality correspondence you need the PowerType. The PowerType gives you bi-directional printing at a brisk 18 CPS. Standard Epson and Qume codes make it adaptable to virtually all personal and business computers!

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The PowerType lets you choose a print pitch of 10, 12 or 15 CPI. It also offers both parallel and serial interfacing as standard.

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NOW *Don't spend a fortune to own the world's most popular printer. . .*

EPSON RX-80 F/T

LIST $499 ONLY **$289**

The RX-80 F/T offers you the precision printing quality and durability that is found in every Epson printer.

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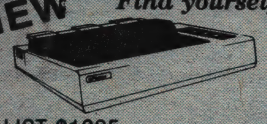

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LIST $1395 **$CALL & SAVE$**

Now you can get speed and top print quality with the EPSON LQ-1500. At a lightning speed of 200 CPS, you can get those reports and memos done in a snap. No more waiting for your correspondence – the LQ-1500 offers a near letter quality mode at a brisk 67 CPS to get those letters done today.

Need those financial reports tomorrow? Providing you with a 15.5 inch carriage, the LQ-1500 is perfect to handle your spreadsheet needs.

Want to make sure those reports are understood? Why not try emphasizing your points with graphs and charts! The LQ-1500 can deliver charts and graphs beautifully!

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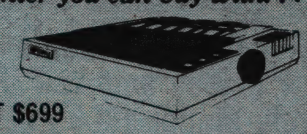

The FX-80 is one of the most advanced personal printers you can buy. Offering you a print speed of 160 CPS, the FX-80 also has a special half-speed quiet mode that keeps noise to a minimum. It contains an integral RAM that will allow you to create your own set of up to 256 characters or symbols, and then add them to the FX-80's already vast array of 128 different typestyles.

Are there times you need just single sheet paper? No problem with the FX-80 which gives you both pin and friction feed. And with the 2K buffer you can use your computer while your printer continues to print.

Needing graphics to get your point across? With the Epson FX-80 you can do precisely that. With everything from graphics at 60 DPI (dots per inch) to 120 DPI, the FX-80 gives you professional looking charts, graphs, and illustrations.

For versatility to meet your ever-increasing printing needs – the FX-80 is for you!

NOW *A printer that's all business. . .*

ONLY **$589** **EPSON FX-100** LIST $999

Need those spreadsheets and ledgers printed yesterday? No more waiting with the FX-100 giving you a capacity of 136 column printing and a print speed of 160 CPS.

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NOW *Print Memos to spreadsheets with Epson quality with the. . .*

ONLY **$399** **EPSON RX-100** LIST $895

Offering a steady 100 CPS printing, the RX-100 gives you a fifteen inch wide carriage for spreadsheets and ledgers. With both friction paper feed and a removeable tractor feed, you can print on forms from four to fifteen inches wide taking care of all your printing needs.

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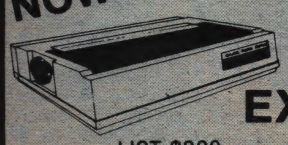

SILVER REED EXP 400

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Designed with precision engineering, the Silver Reed EXP 400 gives you quiet typewriter quality printing at a brisk 12 CPS. Give yourself some choices in your printing style! Silver Reed EXP 400 supports a full range of word processing functions including superscript, subscript, bold printing and much more! Will it interface with your computer!?! EXP 400 has a standard centronics parallel interface making it compatible with most popular computers! With logic seeking, bi-directional printing, the EXP 400 will give you letter quality printing time after time after time!

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NOW *printers give you all the features of a letter quality and more with. . .* ONLY

brother HR-15 $359

The HR-15 gives you Daisywheel printing and added attractions such as text reprinting, red printing, attachable cut sheet feeder and the exclusive Brother keyboard attachment.

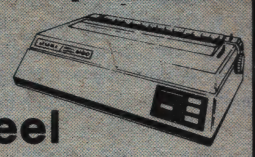
Take advantage of the 3K buffer and a unique text reprinting function that the HR-15 offers.

Featuring shadow printing, automatic underlining and super/sub scripting. The HR-15 gives your printout professional quality.

HR-25 (23 CPS)	$895	$649
HR-35 (32 CPS)	1245	839

NOW *Get the performance and features of a $2000 printer at a typewriter price with. . .*

JUKI 6100



$429 Daisywheel

With the advanced features of a high priced daisywheel combined with convenience and dependability, the Juki 6100 is the printer for you. With this industry leader you do not have to give up quality for savings. You can trust your business image to Juki. And you need not worry about hardware or software compatibility problems. The Juki 6100 is plug compatible with all popular microcomputers as well as with such software packages as Wordstar and SUPERscripsit. You can even print charts and graphs. You will save time and effort with the standard 2K print buffer. So order your Juki 6100 today at this special sale price of only $429.

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Computer Shopper is published monthly for $15 per year by Patch Publishing Co., Inc., 407 S. Washington Ave., Titusville, FL 32796. Application to mail at Second-Class Postage Rates is pending at Titusville, FL and additional mailing offices. POSTMASTER: Send address changes to COMPUTER SHOPPER, P.O. Box F, Titusville, FL 32781.

Patch Publishing Co., Inc.
407 S. Washington Ave., P.O. Box F ● Titusville, FL 32781
(305) 269-3211
Source ID No.: TCS575 ● Compuserve No. 70275,1023

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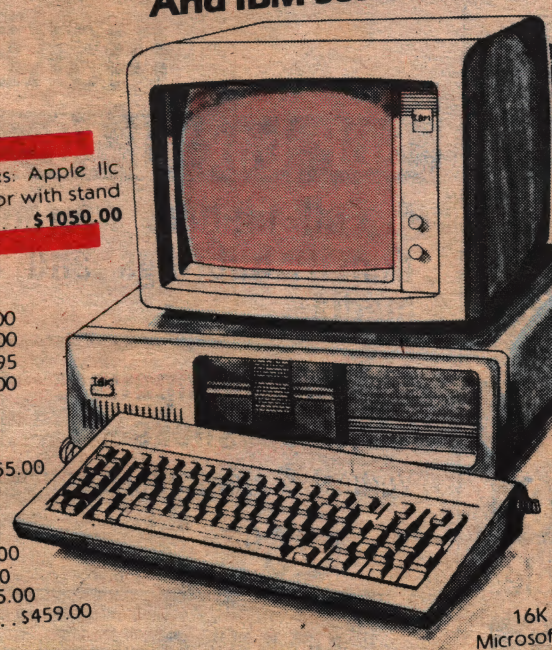

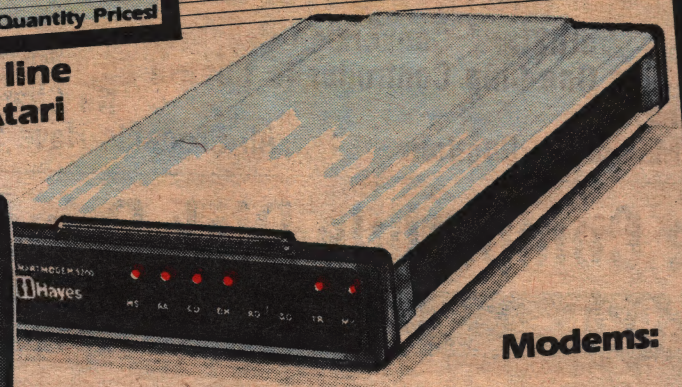

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Tandy 200 — The Next Generation of a Winner!

by Ed Lewin

The Radio Shack TRS-80 Model 100 was the most successful lap portable to date. The ubiquitous tap tap of the Model 100 keys has become a feature at every press conference in the land and journalists are not the only ones who have adopted this small computer as their own. Students, business people, and scientists all carry the Model 100 or have it sitting on their desk. While there are other lap portables that far exceed the Model 100 in capabilities, they also far exceed it in price. Furthermore very few users need the extra costly features that these other lap computers include. It is obvious that in spite of some shortcomings, the Model 100 is a hard act to follow.

I am pleased to report that Tandy has done it. The 1985 edition of the popular lap computer is called the Tandy 200, a name that represents the far-reaching change in Tandy marketing that has evolved in the past year. The new computers such as the Tandy 1200HD, the Tandy 1000 and now the Tandy 200 are not Radio Shack TRS-80 computers, they are Tandy computers, the beginning of a changed market approach. Tandy now markets third party software and builds MSDOS computers and Unix computers for business and industry. The transition from parts store to high tech marketing center is complete.

The Tandy 200 Computer

As shown in the photograph, the Tandy 200 looks a lot different than the Model 100. The tilt-up LCD screen displays 16-lines by 40 characters and folds to form a cover for the computer. For graphics use the screen provides a 240 by 128 pixel matrix. While this is not "Hi Res" it is not bad for an LCD screen.

In the memory department the Tandy 200 really is different from the Model 100. It supports bank switching and can use up to 72K in three banks of 24K each. How this works out for a user I am not certain. In my Model 100 I have 32K and sometimes I run out of memory when I am using it for a lot of text. I would not like to go back to 24K but the 200 also can copy files from one bank to another to get the full use of the 72K. The memory restrictions of the 8-bit CPU are annoying when compared to the CMOS versions of the 8088 used in the more expensive lap machines like the HP Portable.

The Tandy 200 also comes with a 72K ROM containing the operating system and the programs. One extra 72K ROM may be added for additional "firmware" program packs. The 72K ROM provides for additional programs in ROM such as Multiplan and a much improved TEXT program.

The Model 100 has a great appetite for batteries. Its introduction and popularity must have increased Radio Shack's battery sales by a factor of 100! The good news for Tandy 200 is the ability to use NiCads (after some modification). This will be a popular feature with Tandy 200 owners. Many Model 100 users never realized that there is a non-removable set of NiCads inside the computer. These are used to retain the memory when the computer is turned off. These batteries take their charge from the AC adapter when it is plugged-in, if the AC adapter is not used the NiCads will take their charge from the batteries you put into the computer. That is why the Model 100 used so many batteries. In the Tandy 200, a similar scheme is used. The internal memory NiCads will hold the RAM contents alive for 10 to 16 hours depending upon the size of the RAM. If the operating batteries are also NiCads, the RAM retaining period will be slightly less.

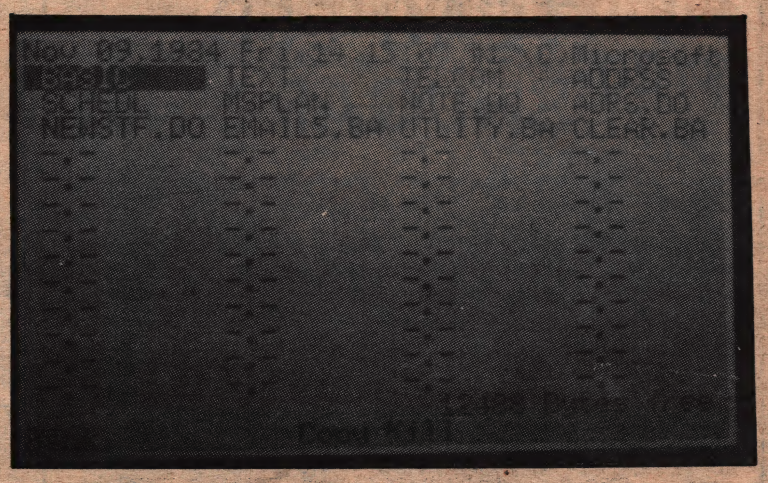
Looking at the Model 100 and its relative made for NEC, the one difference that you first notice about the NEC is the cluster of the cursor control keys that are grouped into a square on the front panel. The Tandy 200 has this same type of cursor control key grouping, a definite improvement over the Model 100 layout.

The TANDY 200 is a worthy successor to the TRS-80 Model 100. Portable users have waited for a long time for this computer to come out and here it is. The TANDY 200 was worth waiting for, it is almost everything you wanted and were afraid Tandy would never give you.

As shown is the picture of

Continued on page 8

The Tandy 200



Close-up Of Screen of Tandy 200

Letter Quality Redefined

By Gene Bethold

In 1939 IBM introduced the Selectric Typewriter (tm) and it became the standard by which all other office typing machines were judged against. Something typed on a Selectric (especially in Press Roman typeface) was judged to be "Letter Quality" from that time on.

The first computers used solid type drum and chain printers for high speed production printing and teletypes for printing terminals. When terminals started being installed in offices, there was a demand for "letter quality" printing terminals, and IBM devised terminals such as the 2741, which used the Selectric print mechanism, as its print element. The quality of these was certainly letter quality but their speed was only 12 characters per second and they broke down often. The Selectric mechanism was simply not designed to take the continuous print cycle that a computer terminal worked under.

The demand for high-speed, lower-cost computer printers was answered by the Centronics and other dot matrix printers which could be operated at high rates of speed and produced what we came to call "computer printing" and was really low-resolution dot matrix printing. The labels and computer reports were legible with these 5 x 7 matrix characters without decenders, but they were far from "letter quality."

In the offices, word processors and minicomputers started to replace typewriters and calculators. They needed printers and they had to be much better than dot matrix characters. The answer was in the development of daisy wheel printers. These new machines used a solid print wheel with spokes coming out of a central hub. Each spoke had a character on it. It was called a daisy wheel because the spokes were arranged like petals on a daisy. The printer rotated the daisy wheel until the proper character was in printing position and then the print hammer struck the character through a print ribbon and made a clear sharp impression on the paper. The daisy wheel then moved to the next character position, and the process was repeated until the end of the line. Then the paper was moved one line up and the process was repeated. This was true letter quality printing and the wheels were removable so type fonts could be changed as required. The daisy wheel printer could operate at 25 characters per second, and with improvements to allow the printing to start anywhere in the line, the speed could be boosted to 55 characters per second. Now daisy wheel printers became the standard for "letter quality printing."

The old measurement: Letter Quality = IBM Selectric or equal, is obsolete and should be forgotten. Correspondence quality dot matrix printers are just as good, Laser printers are even better. The people who demand daisy wheel printing only, are the descendants of those who demanded Spencerian hand written script in place of typewriters.

There are a few drawbacks to daisy wheel printing. Because the wheel must be moved and rotated at each

Continued on page 8

Tandy 200
Continued from page 7

the Tandy 200, the larger screen allows for more Menu entries. The top of the menu shows the BASIC, TEXT, TELECOM, ADDRESS, SCHEDL built-in programs that existed on the Model 100, plus MSPLAN which is the name used for Multiplan. The rest of the Menu is available for the listing of files. There is provision for 46 entries for each bank of RAM. At the bottom of the Menu are Menu indicators for BANK, COPY and KILL and a message indicating how many bytes of user RAM are free for your use.

One of the things that made the Model 100 so popular with journalists is the TEXT built-in text editor. It is not a full word processor because it lacks a formatter. This has led to the sale of countless formatting programs for the 100. In the Tandy 200, the formatting capability has been incorporated into the TEXT program so that the user can set the width, left and top margins, page size and lines per page. The printout can also be set for continuous run or stop between pages. The TEXT program now includes a LIST function which performs string search selecting records from any file.

More memory, bigger screen, more built-in software, extra functions, better Telecom program. Tandy 200 is a dream come true.

The NOTE.DO file used in SCHEDL has up to 256 alarms which may be stored in the file. At the noted time, an alarm will sound and when the user returns to the Main MENU a comment is shown identifying the event that sounded the alarm. The alarm "wakes up" the computer if the power is not on at the time of alarm.

The Multiplan spreadsheet in ROM can operate with a matrix up to 63 columns by 99 rows. It includes a calculator function that is available from within any program.

Next to TEXT, the most used built-in program is TELCOM, the communications program. In the Tandy 200 there are several improvements over the previous version. Originate/Answer selection is now done in the program instead of by a switch on the side of the computer. Other controls include a control-character filter switch that ignores all ASCII codes 0-31 except carriage return (CR) and line feed (LF) and a line feed switch that permits the system to accept or ignore LF after CR. The dialing of the direct connect modem can be set for pulse dialing at 10 or 20 pps, or for Tone dialing.

Another difference between the Model 100 and the 200 is in the Power ON/OFF switch. In the Tandy 200 it is a push button switch on the front panel.

All these improvements prove that after years of ignoring user wants, Tandy now listens and listens well. The fact that Ed Juge, Director of Marketing Planning at Radio Shack, has spent time on CompuServe Model 100 SIG talking to users from all over the country, shows in the improvements made to the new lap computer. It is almost a wish list for such a computer. Of course we do wish for an 80 by 24 screen, but at the same time realize that the state of the art does not allow this at a price we can afford. After seeing the new "big screen, big price" lap portables at COMDEX, I think that the Tandy screen although smaller is much better.

For those who want to upgrade from Model 100 to Tandy 200, there is a requirement to modify machine code programs because the ROM calls are different between the two models, however BASIC programs will run with no problems. The Model 100 accessories will function on the Tandy 200, good news for people who own the Video/Disk interface. A new cable which plugs in the back of the Tandy 200 instead of the infamous pin socket connection on the bottom of the Model 100, is required. Video/Disk owners will be glad to buy an extra cable to get rid of the old one.

Tandy/Radio Shack and third party vendors are hard at work developing software for the new Tandy 200. There are quite a few companies in the business and they all expect the Tandy 200 to be a sweeping success. Tandy/Radio Shack is also considering additional ROM firmware but is promising nothing at this point.

The Tandy 200 measures 2 3/16' high by 11 3/4' wide by 8 1/2' deep and weighs 4.5 lbs. It fits into a carrying case which costs $39. It will appear in the Radio Shack stores after Jan. 1 and I think it is another winner.

Tandy has priced the 200 at $999 with 24K RAM and additional 24K RAM modules are $249. That is about the same price I paid for my Model 100 at the beginning of that computer's history. I was one of the first journalists to see the Model 100 and became so attracted to this little wonder that I ordered one on the spot. I will upgrade to the Tandy 200 as soon as I can. ●

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Letter Quality
Continued from page 7

print position, there is a limit to its speed. Even when two daisy wheels were used, the fastest print speed obtained was about 90 cps. Compared to dot matrix printers which can print as fast as 600 characters per second, this is painfully slow. The other drawback is that to change the type style you have to stop and replace the daisy wheel. In a dot matrix, you can change the type style "on the fly" by electonically selecting a different matrix layout from a programmed ROM.

The demand for print speed vs. the demand for "print quality" caused the designers to come up with various schemes to improve the quality of dot matrix printers. The first scheme was designed by Centronics, the pioneer company in dot matrix printing. They shifted the print head slightly during a second pass, and it filled in the gaps between the print dots, giving the look of solid type. This did reduce the speed of the printer, but it was still much faster than daisy wheel printing. Other schemes added additional print wires to the dot martix print head. These fired in such a way to fill in the gaps with only one pass of the print head, although the process did slow the speed somewhat. These schemes are called "near letter quality" and some of them are so good that it takes a magnifying glass to determine that the character was not printed by solid type. The great advantage of this type of printer is that it replaces several machines. You can select draft quality at very high speed, or report quality at a sightly lower speed, or near letter quality at a speed twice the rate of a daisy wheel printer. In addition you can plug-in modules that give you a wide choice of type styles without changing any wheels.

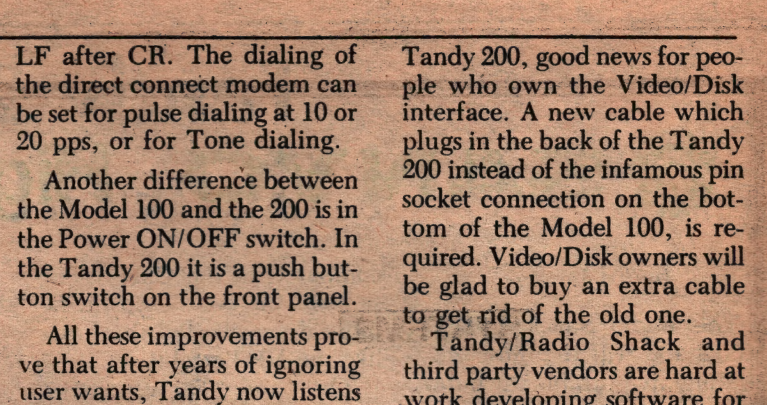

Illustration 1

In the early days of computer printers another type of printer was invented called the non-impact printer. These machines operated by thermal action on special paper. While they were silent, the paper was not office quality and had to be copied on to regular bond paper to be of any use. Outside of places like hospitals where the hammer of a printed was objectional, these machines were not too popular. However, these too have been improved with special ink being put in a special ribbon. When the electric current hears the wires in the print head, the ink is transferred to the paper. Regular paper is used in this process which is called Thermal Transfer. The result is very high-quality characters printed on normal paper without noise and at fairly high speed.

Another new system is the use of a jet of ink to spray the characters onto the paper from a movable print head. This too

Continued on page 10

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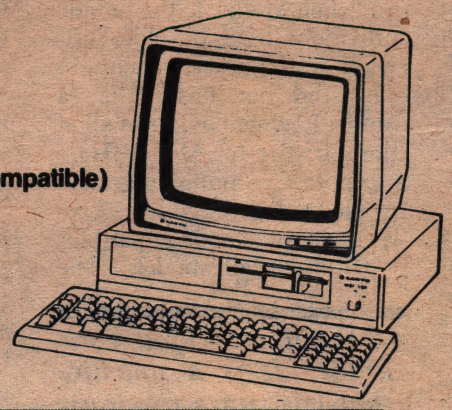

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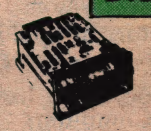

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How To Buy And Sell Used Computers And Peripherals

by Stan Veit

Part 1. Should I buy a used computer?

Everyone operates a "used computer," so you should have no fears about buying one—provided you know what you are buying. There are three questions that are important when deciding on used equipment vs. new equipment.

First: How much work can you get from the used equipment?

Second: Will you be able to get the software you need to operate it?

Third: How can you have the equipment repaired?

If you are satisfied with the answers to these questions, there still remains the final and deciding question: How much will you save by buying used equipment?

In the following paragraphs, I will discuss some answers to these questions to help you make up your mind about buying used computer equipment.

An electronic device is different from mechanical equipment—for example, an automobile. The auto has a fairly finite life, somewhere around 100,000 miles. Sure, there are lots of cars that last a lot longer than that, but there are also a lot that fall apart at 60,000 miles. A personal computer is an electronic device that has few moving parts. If it is not subjected to environmental extremes, it will last for years and years. Here and there a chip may fail and require replacement, but as a rule, electronic circuit boards do not wear out. We can safely say that personal computers, like good clothes, go out of style before they wear out. There are components of a computer system such as keyboards, disk drives and CRT tubes that will require eventual replacement, but since the introduction of personal computers in 1975, almost all of the ones built are still in working order. You can safely say that if you buy a used computer that is working when you buy it, it will continue to work with a minimum of maintenance.

The question of continuing software support for a used computer is very important because software is the fuel that operates the computer. If the used computer has an operating system that is unique to one manufacturer's equipment you may run into trouble. Of course this depends upon the manufacturer's efforts to maintain compatibility of software as it upgrades new releases. Even if software compatibility among succeeding models is provided, it is usually upward compatibility only. This means that the newer model can run software written for the previous models, but not necessarily the reverse. For example when Radio Shack went from TRS-80 Model I to Model III and then Model 4, they made provisions to run the older software on the newer machines. This did not mean that a Model I owner could run all of the software for Model III.

Apple Computer upgraded Apple DOS through successive revisions and kept compatibility through all models. The owner of the older Apple II can still run the latest versions of DOS and all the software written for it. This is one of the main reasons for the huge library of Apple II software in existence. It has been cumulative.

What is a used computer? It is a machine that has run a program, therefore everyone uses one. Why not buy a previously used machine and save money. This series of articles will show you how to "kick the tires" of the used computer you are considering buying. It will also teach you how to sell the computer you no longer need.

Computers that use the CP/M operating system have the largest library of software in the world to draw upon. This does not mean that every program is available in every disk format ever used for CP/M. However, it is almost true. If you look hard enough, you can find the CP/M software you want in the disk format your computer uses.

MSDOS is fast becoming the de facto standard for software and its catalog will soon exceed the Apple DOS, TRSDOS and CP/M-80 collection of software. There is one advantage of MSDOS computers over CP/M computers when it comes to compatible software. While the CP/M computer manufacturers used every conceivable type of disk format the human mind could think of, the makers of IBM PC clones stuck to the IBM disk format. The odd ball formats like Victor 9000 and a few others, did not last very long and there are not that many of them to look out for.

If you are considering buying a used Commodore CBM, or PET computer, you may find that there are differences between models that effect software compatibility.

Some of the older personal computers like OSI and Digital Group used operating systems that died with the manufacturers, except for the support of a few third party vendors and a lot of dedicated users' groups. There is still software around for these old machines but it is a lot harder to find. Very few people are writing software for old computers, but there are always a few die-hards still at it—usually in the users' groups.

The question of repairing used computers depends on what kind they are and if the company is still in business. If you are considering an S-100 computer, you should have no trouble unless you have a problem with an IMSAI or Altair front panel. Even these are well-documented and use common parts. If you can afford to have a technician spend his time finding the trouble, it can probably be fixed. However, you can live without the front panel and still run CP/M on your S-100 antique. Everything else in the old reliable is replaceable without much trouble.

There are still people who can repair and maintain SS-50 and OSI computers. They are harder to find and you may have to wait for the job, but they still can be fixed. I don't know how long you will be able to keep them running. Radio Shack will still repair all of their older computers, but there is a catch. They will not work on computers with "foreign" parts. You better make sure it is pure Radio Shack.

Old Apple IIs present no problem. Any Apple dealer is a service center, and he can fix

Continued on page 12

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Letter Quality
Continued from page 8

results in letter quality silent printing at fairly high rates of speed. An interesting thing is that colored inks can be used with both the thermal transfer and ink spray printers providing full color printing of computer output.

The development of small xerographic copiers using plain paper lead to their incorporation into a new type of computer printer. This uses a laser to put the complete image of a page of computer output on the copier drum. The fixation of this image on a sheet of paper is the same process done by a copier. These laser printers reproduce a complete page in the time it takes to print one line. The quality is not "letter quality," it is better than that. It is "typeset quality" looking like it had been printed from typesetting equipment. In fact, you can make printing plates directly on some of these machines.

Because of these new techniques we need to examine our office standards of what is letter quality. People are afraid that someone will be insulted by receiving a "computer letter" rather than one typed by a person. This is foolish because everyone knows that businesses use word processors rather than typewriters and that letters are stored in computers. The use of "near letter quality" dot matrix printers is being accepted more and more these days. No one can tell if a letter was printed on a jet ink printer, thermal transfer, or laser printer, or if it was printed with a daisy wheel printer. We have already changed our standards many times before and it is time to do it again. ●

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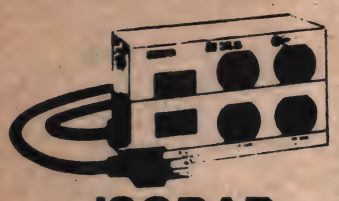

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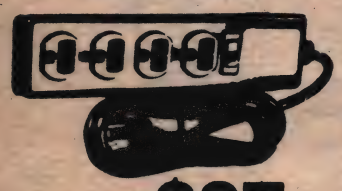

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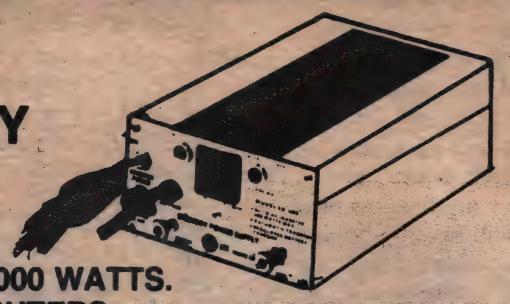

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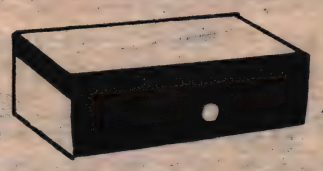

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How To Buy And Sell Continued from page 10

any Apple II. In addition, there are so many Apple clone parts on the market that you can replace anything you need from a dozen sources. Apple III repair may present a problem by the end of 1985 but for the present, Apple dealers have no problem with them.

IBM PCs and clones of this popular computer are repairable by any dealer without trouble. You can even update an older main circuit board, replacing it with a later model made by IBM or some other manufacturer. They all seem to work as well.

If you buy used computers made by companies who are no longer in business, you will have trouble repairing them. If you buy them it should only be at a low enough price so that you can throw away anything that stops working, and can't be fixed by replacing a chip or two.

These are the main questions that people consider when thinking about buying a used computer and some of the answers to them. There are other answers pro and con. If you have decided to save money by buying a used computer, you may want to make an extensive study. I urge you not to study too hard; nothing is final. If you buy something that does not suit you, then advertise and sell it. One person's problem is another's solution.

Now that you have decided to give used equipment a chance, you want to know how much you will save by buying it. That depends upon what you buy and where you buy it. My rule-of-thumb based upon experience and study is that you will save about 50% of the current price on fairly new equipment and from 60% to 75% of the price of older equipment. The reason that there is so much variation is that the price of computer equipment has been declining in recent years. In 1982, I paid about $5,000 for my IBM PC system. Since then the price of this computer has declined and newer models have come out with more memory on the main board. I would not expect to get more than $2500 for my system on today's market (not including my hard disk). When I bought my computer, I got no discount off the list price. PCs were on allocation and it was a seller's market. Today, you can get sharp discounts if you shop the vendors in Computer Shopper. There has to be a differential between the price of a used unit, and the price of a current model being sold at a discount. Sometimes, the seller throws in extra boards and/or software. If it is software you need, it sweetens the bargain. If not,it is worthless.

How do you judge the price of an older model? There you must let the market forces take over. You must read ads and price the equipment at computer fairs and flea markets. You will soon get a line on the correct price range. Then bargain. No one expects to get their asking price unless they say that the price is "firm."

Some computers were sold out on a clearance sale, for example the Texas Instrument 99/4A. Some went for as low as $55. The sale is over and TI 99/4A computers continue to be used by their loyal owners. You will not get the bargain price if you try to buy today. They have become scarce on the market and the price has gone up a great deal. Atari 800XL computers are being sold for $119 right now. Chances are that after this stock of them is gone, you will have to pay much more—if you can find one. This has happened with many computers. The demise is announced and the price drops sharply. After the last batch are sold at a big bargain price, the value rises and finds some level in the market according to the law of supply and demand.

When people start to buy computers as collectibles, the prices will again rise. Just try to buy an Altair or IMSAI in working order and see how much you are asked for it! They are now collectors' items—classic computers—and they are out of the range of "Used Computers." Try to buy Digital Group or SOL computers and you will find the same thing. If this is true, what is a "used computer" and what is an antique computer? Well, antiques are supposed to be at least 50 years old, but the entire personal computer industry only started in 1975. Therefore, they define antiques as members of the first generation of personal computers. The Altairs, IMSAI, Digital Group, SWTPC, OSI, SOL, TRS-80 Model I to name most of them (there are a few others even rarer). The rest are used computers, still useful and cheap—a good way to start in the world of personal computing.

Where can you find used computers to buy? Most computer dealers do not offer trade-ins, or if they do offer them, the old traded computer is rushed out of the store so it does not compete with new models. Some dealers in used computers are starting to appear in areas where there is a lot of personal activity. The Boston Computer Exchange is one such activity. The best place to find a used computer is still in the classified ads in Computer Shopper and other such magazines. There are some ads in local newspapers, but these are of such fleeting attention that unless you just happen to see what you want on the day it is advertised, it is gone forever. People do not throw away the Shopper for months, so you can search at your leisure. A phone call will determine if the item is still for sale. Good buys sell fast so it is best to read the Shopper every month and call at once if you are interested in any ad.

Next month I will talk about the pitfalls of buying a used computer and how to eliminate them, and what to do about getting the software you need. ●

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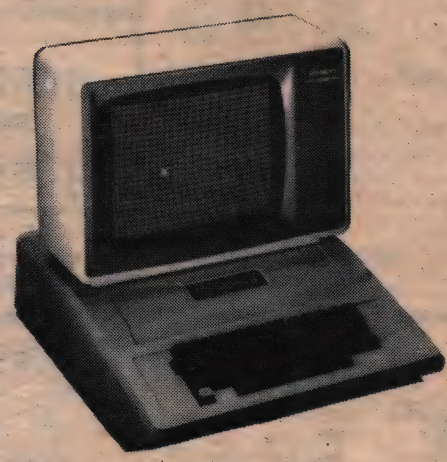

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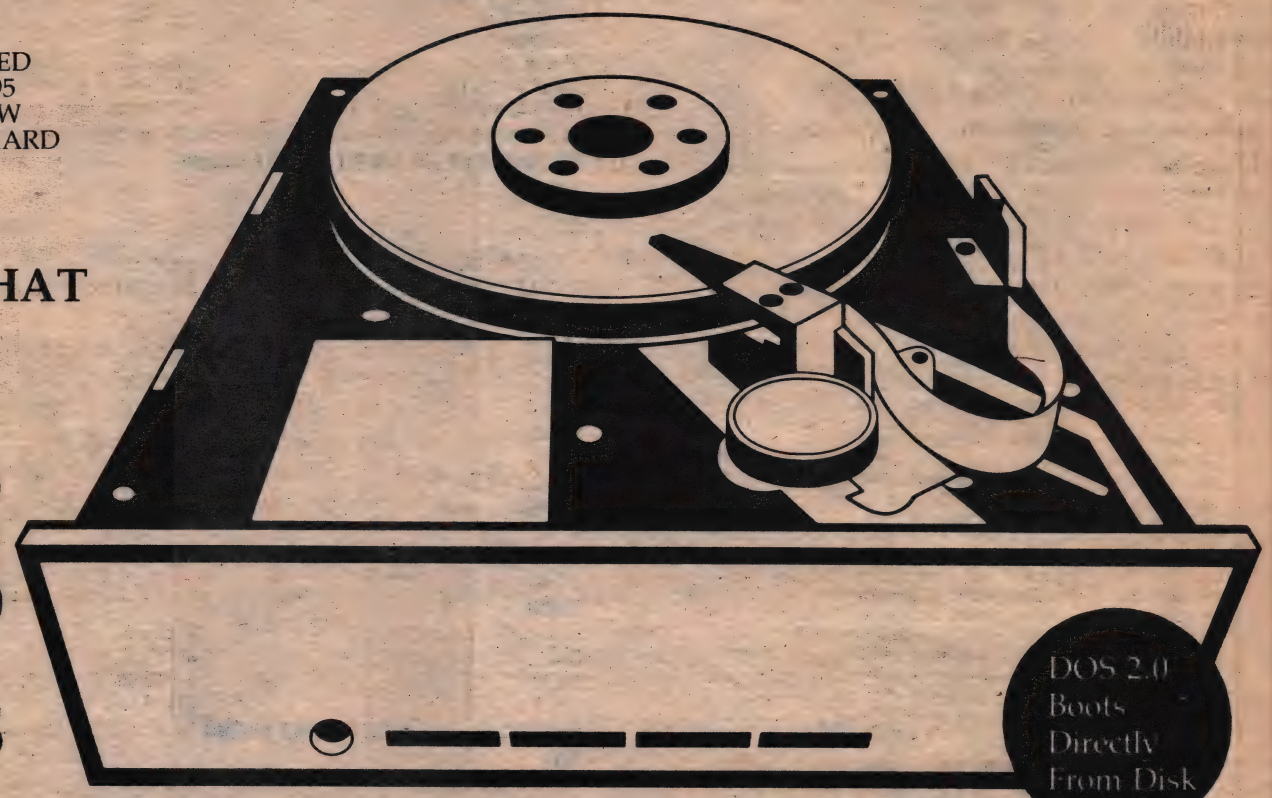

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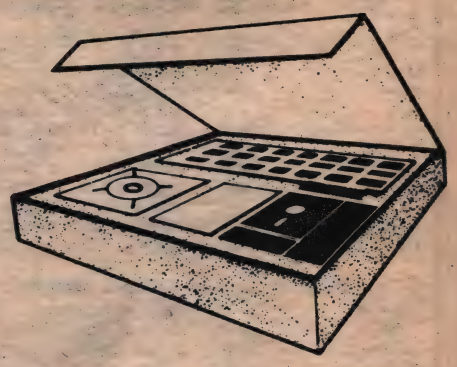

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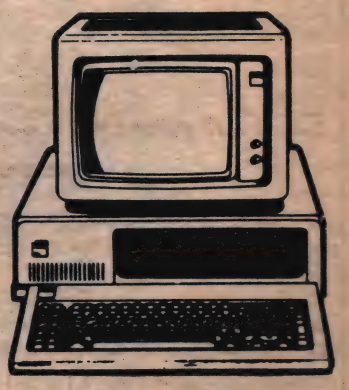

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Editorial

By Stan Veit

Personal Computers Are Ten Years Old — A Look Back

The January 1975 issue of *Popular Electronics* magazine is generally regarded as marking the birth date of the Personal Computer since it contained the first part of the construction article for the Altair 8080 Computer. The Altair was certainly not the first microcomputer. *Radio Electronics* magazine had previously published an article on building the Micro 8, a microcomputer using the 8008 CPU, and Scelbi Computer Co. was already selling kits to build their 8008 computer. However, the Altair was the first microcomputer using the 8080 CPU that could be built for less than $400, and it started the industry as we know it today.

The credit for starting the whole thing is now the subject of many acrimonious paragraphs by Art Salsburg, editor of *Modern Electronics* magazine, who was the editorial director of *Popular Electronics and later of Computers & Electronics* magazine. Art seems to feel that too much historical credit is given to Les Solomon who was technical director of *Popular Electronics* and not enough to Ed Roberts of MITS, who actually developed the Altair and to Art Salsburg himself, who was responsible for its publication. Perhaps Art is right. Those of us who worked on *Popular Electronics* magazine know that nothing was published in that magazine without Art's approval and that he originated some of the ideas for articles that appeared.

The problem with historical credit is that it often goes to those who are in the limelight. Both Art Salsburg and Ed Roberts are men who never sought publicity. Art himself pushed Les Solomon as the technical director of the magazine and did not claim his rightful place until it was too late. The old saying still applies, "Success Has Many Fathers." Regardless of who was responsible for the MITS Altair, it was the spark that ignited the explosion that became the personal computer revolution.

I became involved in personal computers in 1974 when I worked as a technical writer for a large APL time sharing company. IBM had come out with the Model 5100 which really was the first practical personal computer (except for its price). The company I worked for experimented with the idea of using the 5100 which ran APL as a front end pre-processor for the time sharing network. It was not practical because the APL it ran was not compatible with our mainframe version of the language. Anyway, about that time a small printing terminal with a built-in acoustic coupler became available and we were able to carry it with us and connect into our system from any phone. Having this terminal at home made me wish for my own computer and when the Altair article appeared I decided to get one.

In December of 1975, I found myself out of a job; a fact that I saw as an opportunity to go into business for myself. Dick Heiser had opened the very first Computer

Continued on page 16

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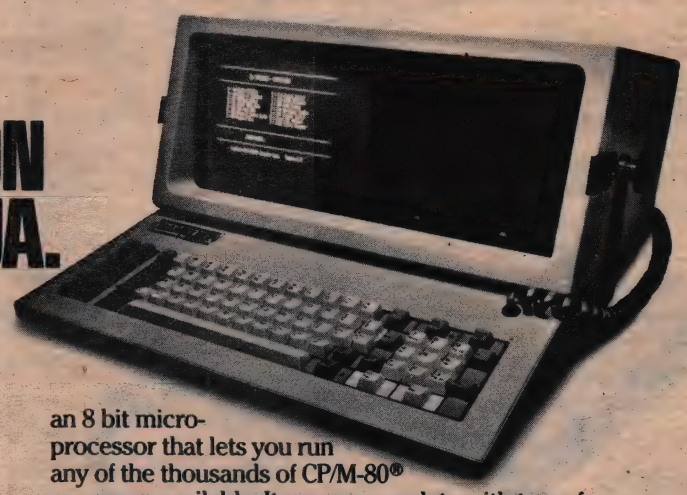

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Editorial
Continued from page 15

Store in Los Angeles and I thought that New York could also support such a store, and I was going to be the one who opened it. My concept of a computer store was that it would carry every brand of computer available. I got the idea from the camera stores on 32nd Street in New York which carried all the different brands of cameras. This idea clashed with Ed Robert's idea of a computer store. He believed that Altair stores should only sell Altairs. "Ford dealers don't sell Chevies," he was reported to have said. As a result, I never got the Altair line for my store. While we were in business we sold IMSAI, Sphere, South West Technical Products, Processor Technology, Morrow, Cromemco, Digital Group, OSI, Alpha Micro and were one of the first Apple dealers.

The Computer Mart of New York opened on 30th Street and Fifth Avenue at the beginning of 1976, making it the first computer store outside of California and the very first one to sell a full selection. Our "first" was only a slim lead because in the next few months, many other stores opened their doors in all parts of the country. By the time of

Continued on page 17

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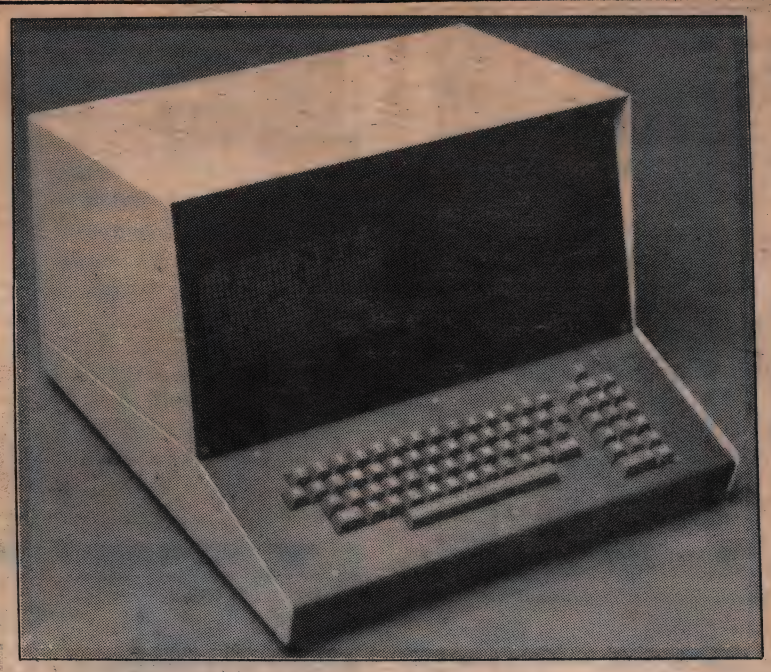
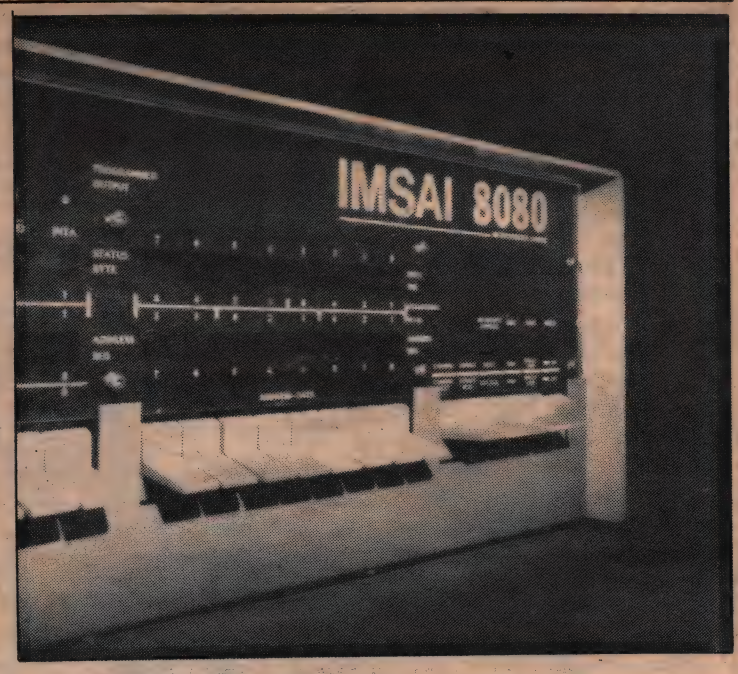
Editorial
Continued from page 16

the first Trenton Computer Fair in the spring of 1976, there were a few other stores exhibiting. By the first Atlantic City Show in the summer of 1976, there were almost a hundred computer stores throughout the country.

At first, Computer Mart of New York sold the Sphere and IMSAI. The Sphere was the first table top computer (except for a huge power supply on the floor, which was NEVER shown in their ads!). It had no bus and all the different cards were connected by ribbon cables, attached by DIP connectors which kept coming out of their sockets. Sphere ran a version of BASIC that was so slow that you could add a column of numbers in your head faster than the Sphere could add them and display them on the CRT! I took a Sphere to the first Trenton Computer Fair and irate Sphere customers, who had bought direct from the factory, almost mobbed us. We got rid of our Sphere dealership quickly, but SOCS (Stan's Own Computer System) was used as a terminal for other computers for a long time, until we sold it to (believe it or not) IBM! They used it in their labs for parts to keep their own Sphere running after the Sphere company folded.



Sphere—First Desk Top Computer



Imsai 8080 Computer Front Panel

Our most popular seller was, of course, the IMSAI, an improved copy of the Altair. The way I sold them was to place one next to my own Altair and ask the customer to compare the construction of the two machines. The red and blue paddle switches, the attractive plastic front panel, 30 amp power supply and 20-slot mother board of the IMSAI was obviously better than the Altair, and the IMSAI even cost less. I would charge 1/3 of the total price as a down payment and put the customer on a waiting list to receive his kit. When we had sold ten units we would send the payment in full to IMS Associates and they would ship us the computers. When the boxes arrived in New York, I would collect the balance of the purchase price from the customer. All he had to do was build the computer. Very few people could build an IMSAI without a lot of help. At least 60% wound up in our shop. Most of our service people were technicians who moonlighted just to pay for their own computers. We had people from CDC and IBM, but our best people were from the US Coast Guard, who had an electronics' school on Governer's Island in New York Harbor. The instructors repaired our customer's butchered computer kits in their off hours.

One evening, a group from New York made a trek to the meeting of the Amateur Computer Society of New Jersey, the largest club on the east coast. There I heard a 14-year old tell how he had built this new computer, all by himself, and it worked the first time he turned it on! I said to myself, "if this kid can do it, so can anyone else. I better get these computers." The computer was the South West Technical Products M6800, and it had a lot of great things going for it besides ease of construction. It cost less than an IMSAI or Altair. It had no front panel switches to key programs directly into memory. Instead,

Continued on page 18

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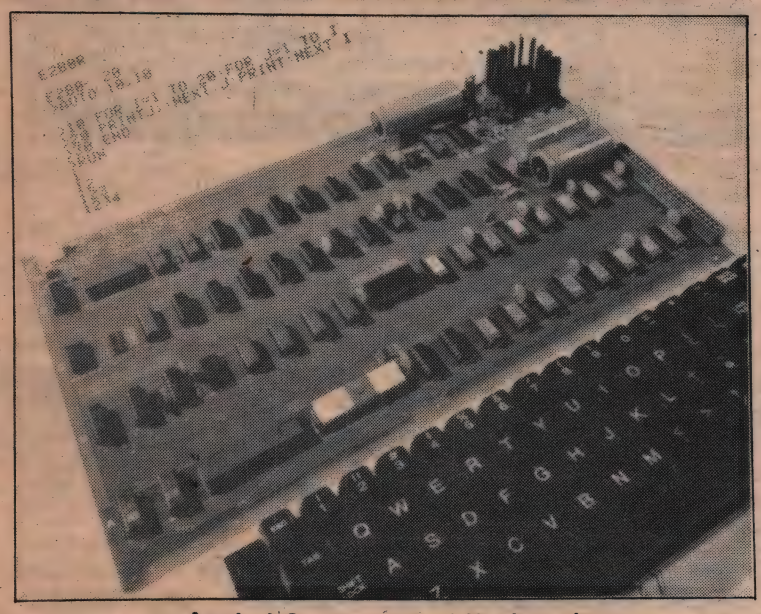
Editorial
Continued from page 17

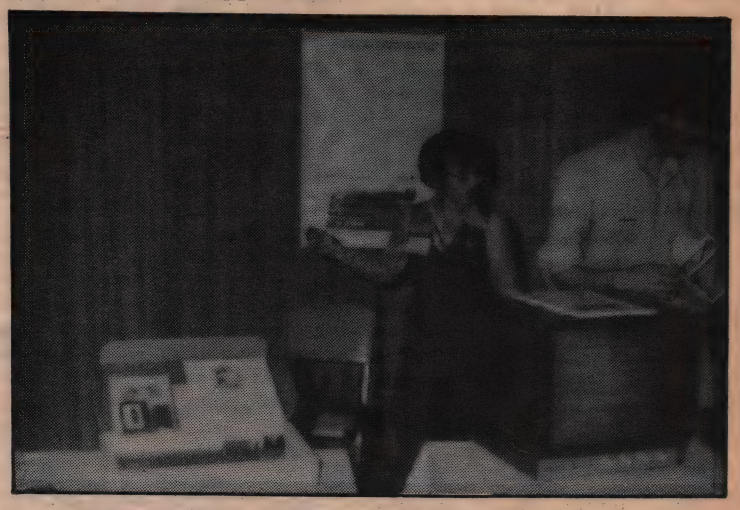
it used a monitor program in a ROM. SWTPC also had a video terminal available that you could build for a couple of hundred dollars. The IMSAI and Altair required a teletype that cost twice as much as the computer (if you bought a used one!) The SWTPC also had a low-cost printer which worked, and a cassette interface to store programs. I quickly became a dealer for South West Technical Products starting a long and profitable relationship. Dan Meyers, the owner of SWTPC, was a character in his own right. He wrote all his ads himself and usually made fun of all the other computers because they had problems that his didn't. He claimed that he felt sorry for owners of his computers because they had nothing to complain about at the computer club meetings. I looked for Dan's ads first thing when I opened a magazine.

One day I got a long distance call from a fast talking young man who said he was referred to me by my friends Paul Terrell from Byte Shop and John French from Computer Mart of LA. His name was Steven Jobs, he said, and he had a complete computer on a single board. All you had to add to his Apple I Computer was a keyboard, video monitor or TV and a $2.98 transformer, and you had a complete computer plus a video terminal! All for less than $600. I agreed to become his New York dealer if the board did what he said it would. A few days later, a C.O.D. package arrived with the Apple Computer, and it worked just as Steve had promised. I became the third Apple dealer.



Apple I Computer and Keyboard

About that time we were invited to attend a meeting of the Association for Computing Machinery (ACM) to display these strange new microcomputers. I knew other dealers would be there with Altairs and IMSAIs, so I had the Apple I built into an attache case and went carrying only the attache case and a 9" video monitor. "Where is your computer?" they asked. I said that they would see it soon. As everyone sat down to dinner, I set up the Apple I on a table and started the "Game of Life," a program that usually required a large computer. It broke up the meeting. They would not believe that I did not have the Apple connected to a mainframe by telephone, until I turned it off and started it up again in front of their eyes. The greatest amazement came when I loaded the program into the little computer from a cassette player. The Apple I used a 1200 baud cassette interface invented by Woz that used only about three chips! That meeting voted the Apple I to be the only true "personal computer." So when Apple Computer makes the claim that they "invented the personal computer" they have some right to that claim.



Dede Veit and Steve Jobs at First Atlantic City Computer Show

Although Altair and IMSAI sold a lot of computers, their biggest problem was memory. The kits came with no memory board. There were a few bytes on the front panel board but aside from that you got zilch memory. So you had to buy memory boards with the computer. Altair sold 4K Dynamic RAM boards that "forgot" because of refresh problems, and IMSAI sold their not-so-good 2K boards. The refresh technique used at that time was called "cycle stealing." It used the CPU for refreshing the memory during a cycle when the CPU was not busy doing something else. If the CPU was working and missed the time period needed to refresh the memory, the memory chips would "forget" a bit here, a bit there. Disasterville!

At this point a new company, Processor Technology stepped into the breech with a 4K static memory board that was reasonably priced and worked. It had no refresh problems because it used static RAM that needed no refresh cycles. Pro Tech, as it was called, sold a lot of memory boards before IMSAI and MITS got static memory boards into production.

As I mentioned before, you needed a terminal with the early computers. A used ASR-33 Teletype was the preferred unit but it cost close to $1,000, made lots of noise and used rolls and rolls of paper. This fact alone kept many people from buying a personal computer. John French of Computer Mart of L.A. talked Lear Seigler into selling a kit to build the Adam 3 Terminal, but they still cost about $700 in kit form so that was not the best solution to the terminal problem. Then Processor Technology developed a board called the VDM-1 that plugged into the Altair Bus (later called "S-100 Bus") and acted as a video terminal without a keyboard. It produced 24 lines of 64 characters each and could use a TV, or video monitor as a CRT. If you had this board and a surplus keyboard, your computer became its own terminal and you could do without the ASR-33 Teletype™. You needed one more thing for this setup and that was a good I/O board. MITS had a fair one, but IMSAI could not seem to get one into production. Their MIO Board came to be known as the "Missing I/O Board." Again, Pro Tech came out with a good board to correct manufacturer's problems. The 3P+S I/O board from PT became a de facto standard among S-100 users. By now, Processor Technology had enough circuits to develop a complete new computer and they came out with the SOL

Continued on page 19

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Editorial
Continued from page 18

Terminal Computer. This neat machine was one of the best looking machines ever built, with an excellent keyboard, solid walnut wood sides and a blue color scheme. They named it after my friend Les Solomon, and introduced it on the cover of Popular Electronics magazine. SOL was a low-profile desk top computer consisting of a main computer board and a five-slot card cage for S-100 boards. The SOL was a success because it combined all the requirements for both a computer and a terminal in one machine. It had one serious defect. It had no provisions for a disk drive and people were beginning to realize that audio cassette interfaces were not good enough for business software. While other manufacturers developed eight-inch floppy disk drives running the CP/M operating system, Processor Technology tried to develop their own disk assembly and PRODOS operating system. The result was a disk unit called Heilos which used unreliable drives. By this time, most of the SOL owners had moved to North Star drives running CP/M. Sales of new units were almost dried up because of competition from Apple and TRS-80. Several large business users threatened law suits because of Heilos defects. Under these pressures, Processor Technology went out of business.

Another early casualty of the change from hobbyist to business use of the personal computer was called the Digital Group of Denver, CO. This company was formed to build the designs of Dr. Suding, one of the pioneer designers of microcomputers. From the beginning, Digital Group had a video-based computer using a ROM operating system and a high-speed tape drive system. They also provided for a choice of microprocessors. The problem with Digital Group was that they never quite got the idea into their heads that the customer wanted the entire computer at one time. They would ship parts and back order other parts, stringing the order over months of waiting. Some of the cases for their system never got shipped at all before the company went under. In spite of excellent designs and advanced software, Digital Group was more a cult than a company.

Technical Design Labs (TDL) of Princeton, N.J. was another technically advanced company that fell by the wayside because of poor management. TDL developed the first Z-80 CPU Board for the S-100 computers. They also built I/O boards and finally a complete line of powerful computers called Alpha series. They were the first company to come out with 16K memory boards using semi-static chips, and they also had excellent software. TDL got into financial trouble when the manufacturer stopped making the memory chips they used on their boards, and they ran into many board failures. The cost of replacing defective chips put them into a bad cash flow position and they called in a team of "management consultants." Nobody is quite clear what happened next, but the original TDL company went into bankruptcy, and a new company called Xitan emerged. They were to develop a new desk top computer of very advanced design called "The General." After signing up all the top retailers to sell The General, the promoters of Xitan moved the company in the middle of the night from Princeton to Cape Cod. I am not sure what happened next, but Xitan again disappeared one night and has never been seen, or heard from since!

Our Editor-in-Chief Stan Veit, is one of the pioneers who started the personal computer industry. Here he looks back on the occasion of the Tenth Anniversary of The Personal Computer and relates some interesting stories about the first decade of personal computing.

Not all the pioneering companies failed and disappeared. Cromemco which started by making S-100 graphics boards grew to become one of the most stable companies in the industry. Their first board was called the TV Dazzler and, when installed in the Altair or IMSAI, produced startling graphics in full color. They had a program called Kaleidoscope which put fantastic, ever-changing patterns on a color TV screen. One night I put a 21" color TV in the window of our store facing New York's famous Fifth Avenue and left Kaleidoscope running all night. The next day I had a visit from NYPD who asked me to "get that thing out of the window" because it had snarled traffic all night as drivers stopped to look at it. They also wanted to know what TV station was broadcasting that "Color Test Pattern" so they could put a stop to it before it spread all over New York! When I told them that my computer was doing it all by itself, they refused to believe me. Needless to say, I never repeated the performance.

SOL Computer

George Morrow started his company by making a combination CPU and front panel board for the S-100 Bus. Instead of a panel of switches like the other S-100 computers, George used a numerical keypad. This was a good idea except that he used the octal numerical system like the minicomputers did. The world was moving to the hex system so George's board was not too popular. He then went on to design memory boards and disk controllers. Finally, he came out with complete computers and his company was one of these that survived to this day.

Most of the people in the personal computer business were men, so I was surprised to have a woman call me to sell memory boards made by her own company. This lady knew her business, and she made me an offer too good to refuse in those days. She would send me an 8K memory board at a very attractive price. If I didn't agree that it was the best I had ever used, she would take it back and refund my money. If I liked it I would buy five more. Since the retail price of these boards was less than any I had for sale, I had nothing to lose and everything to gain. I accepted her offer. Thus, Lore Harp founded Vector Graphic Computer Co., and she was soon selling a lot of memory boards designed by her husband Bob Harp. She then came out with I/O boards and finally a complete computer that

Continued on page 20

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Editorial
Continued from page 19

came in several decorator colors.

Lee Felsenstien, the designer of the SOL and Osborne Computers, had a garage in Berkley. This space was the birthplace of Processor Technology. When they moved to Emeryville, Lee rented the space to Drs. Grant and Goldberg, who started a company called North Star, to build mini-floppy disk units. Their enterprise was a great success because they also had an operating system to run their disks and because Lifeboat Associates in New York developed a method of running CP/M on the small 5 1/4" disks. North Star grew to become one of the largest CP/M computer companies with their Horizon and Advantage computers. They are one of the survivors of the original group of companies.

In a small college in Hiram, Ohio Mike Chieky and his wife Charity started a company called Ohio Scientific, mainly to give employment to college students. Mike designed his own computer bus and a complete set of boards to run on it. These were offered to computer hobbyists at very attractive prices and with the capability to use a choice of CPUs. The company almost by demand came out with a complete line of computers and soon was a major producer of small business computers. OSI was the first personal computer company to offer floppy disk storage and also the first to offer hard disk storage. Mike's machines defied the popular move to CP/M as an operating system for business computers and used his own DOS. By 1980, OSI produced a complete range of personal computers from the cheapest complete computer on the market to the largest multi-user system with 80 Megabytes of hard disk storage. OSI was sold to a large corporation to assure its continued growth. The new owners got rid of Mike Chieky and the company lost its business base when IBM and others entered the industry. OSI was sold several times. At last report, there still was a small company using that once proud label.

One day I got a phone call from Ben Rosen of Morgan Stanley who was then an analyst specializing in the computer industry. He told me that I was going to have a famous visitor—Charles Tandy, owner of Radio Shack. Mr. Tandy came to Computer Mart the next day, and I spent several hours discussing the future of personal computers with him. Before he left, he invited me to go to Ft. Worth with him for the weekend. I accepted and the next day we flew to Texas on his private plane. At Radio Shack, I talked with many of his managers, and the next day they showed me the first TRS-80 computer they were about to release to their stores. Charles asked me how much I thought it would sell for. The only computer I could compare it to was the SOL and that cost $1,800. Well, since they were Radio Shack, I knew that it would be much cheaper so I guessed $1,200. When they told me it would start at $600 with a video monitor, I told them that they had better build enough of them. How many did I suggest was enough? I came up with a figure of 50,000. Then they lost respect for me because I sounded out of my mind. Nobody had ever built that many computers of one type, not even IBM. A year later one of the RS brass told me that I had been right and that they built 10,000 and never caught up with sales for two years.

Before I left Ft. Worth, Charles offered to buy my store and use it and myself to train his managers to sell personal computers. I wanted to sell out to him but was advised against it, so instead I went out of business a year later, but that is another story.

At the five-year mark, personal computers had evolved to the point where CP/M, TRSDOS and Apple DOS were the main operating systems, and the computer that ran them dominated the industry. PCs had not been adopted by the business world except as special uses like VisiCalc. The concept of the home computer was still being preached by Commodore and Atari but not adopted by the general public. Schools were buying Apples, Commodore PETS and TRS-80s for computer courses and hobbyists were still the principle computer users. Then IBM entered the field with the IBM PC.

From the point where IBM entered the personal computer business until today, the story has been one of small companies struggling to stay alive in a market increasingly dominated by large ones. The industry created to supply software and expansion peripherals for PCs has flourished and grown as businesses adopted the PC in place of minicomputers. The end is not in sight and we are here to report to you the ongoing computer revolution. On this occasion, I have taken the space to relate some of my personal experiences and some history of the industry. I do not believe in dwelling in the past because the best is yet to come. However, if you want more of the history of personal computing, drop me a line and I may do a memory dump from time to time. ●

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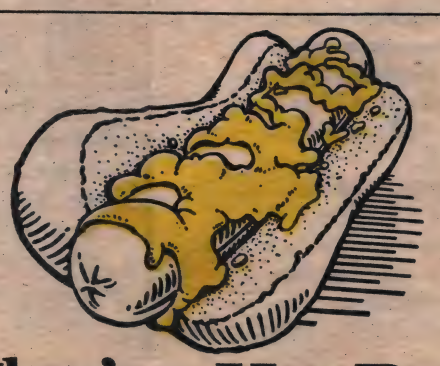

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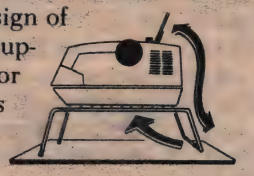

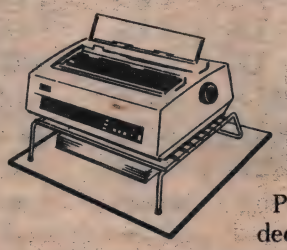

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FEEDBACK FORUM

A Letter To The Editor

To Editor of Computer Shopper:

Regarding the article "Building A Computer At Home" by Tom Larson, in your November issue:

Where did Mr. Larson's friend get the code they were burning into PROMs? Since it is rather easy to read ROMs and make PROM or EPROM copies, piracy of copyrighted ROM code is widespread. I don't think it is in the interest of the micro computer industry for COMPUTER SHOPPER to either implicitly or explicitly promote or condone such piracy. Since the original source of the code is not clearly stated, any number of inferences can be made concerning its origins.

How do you tell, by "close inspection" that a PROM is "used"? After you've burned code into it, about all you can definitely determine is whether or not the PROM contains the code you want it to contain. Any assertion that the PROMs were previously "used" is speculative at best. The time to check the PROMs for previous use (i.e., is it "empty," or does it contain code or random values?) is before you've burned code into them, not after.

How are the holes on the board specially "constructed" so that solder goes only where you want it to? Is the author referring to solder masking, plated-through holes (which have a capillary effect), or what? Both are pretty ho-hum these days.

Did Mr. Larson thoroughly examine and explore the actual circuit used on the board he bought? Does he know the circuit used on the board functions as advertised, with no hidden incompatibilities or traps? Although he doesn't explicitly tell us the identify of his board, the "backwards" character generator required, the fact that he could readily "plug in" a disk controller card, plus buy the controller and RAM card for the prices he quotes doesn't leave too many options. His descriptions are consistent with a particular Apple][clone board that has been available from several sources. The fact that he already had an Apple makes it even more plausible.

This rather common Apple][clone board (sold by at least two COMPUTER SHOPPER advertisers, COMPUTER PARTS GALORE and RAMSEY ELECTRONICS) won't work if any of the Apple II peripheral cards that disables the motherboard ROMs by pulling the INH line low is used; the clone board disables the 74LS138 ROM SELECT decoder and thus disables all onboard I/O including the keyboard, speaker, peripheral connector enables, etc. A real Apple disables only the ROMs by pulling their high-enable low; the decoder continues to function. Cards that use the INH line include ROM cards, RAM cards, alternate processor cards such as the Stellation Two "Mill," etc. The clone board is advertised as being "fully Apple compatible," yet it clearly isn't.

Fixing the problem isn't all that difficult: switch things so the INH line disables the ROMs at the ROMs and not at the decoder. A couple of cuts with a sharp knife and a couple of wire-wrap-wire jumpers are all that is needed.

A legitimate way to get ROMs to populate this board (rather than burning illegal PROM or EPROM copies) is to get an Applesoft or Integer BASIC ROM card, readily available used for $50 or so, and use the ROMs from it. You can then add a 16K RAM card to get the BASIC you don't have in ROM.

The clone motherboard is set up for 2716 or 2732 EPROMs, so you have to switch the pin 18 and pin 21 enables to accommodate real Apple ROMs. If you're correcting the INH line and using real Apple ROMs, just tie INH to pin 18 on the ROMs, cutting the tie between INH and pin 5 of the 74LS02 package at board position E-2. Also cut the trace between pin 4 of the NOR gate package and the pin 4 active-low enable of the 74LS138 ROM SELECT decoder at position F-12. Tie pin 4 of the 'LS138 to pin 5 of the same package. Tie pins 5 and 6 of the 'LS02 package at E-2 to pin 7 of the same package to disable the gate. Cut the trace that ties pin 18 on all six ROM sockets to ground. Then tie the pin 18 connection to INH.

Pin 21 is easier to deal with. On the clone board, pin 21 on all ROM sockets meet and are connected to +5 volts. Cut the +5 connection and jump the line to ground instead.

While the board does accommodate both 2716 and 2732 EPROMs, setting it up for 2732s eliminates access to the 2K common ROM space shared by peripheral slots 1-7. The clone drives one input of a 74LS08 AND gate with address line A-11. The other input of the gate is tied high through a 4.7K resistor. The output of the gate drives the SELECT 1 (or A0) input of the 74LS138 ROM SELECT decoder at board position F-12. If the 'LS08 input that is held high through the resistor is grounded, SELECT 1 on the decoder stays low regardless of the status of A-11. Thus every other decoder output can go low, the rest staying high. Output Y0 selects I/O addresses such as the keyboard, speaker, cassette input/output, the soft switches that control the display mode, the pin 1 I/O SELECT and pin 41 DEVICE SELECT enables on the peripheral connectors, etc. The next higher output, Y1, enables the 2K common ROM space, and the six highest outputs nor-

Continued on page 24

A New Reader Service Help From Don Lancaster

Don Lancaster is one of the people called "The Father of Personal Computering". Without low cost terminals of his design, this industry would have never gotten off the ground. Don is no stranger to our readers. His series on the inner working of Apple Software and Assembly Language software has been one of our most popular features.

Starting next month, Computer Shopper will have a HELP! Column by Don Lancaster. If you have problems with hardware and you can't find answers in your club, or from friends, write a letter to Don and he will answer it in Computer Shopper. All letters must be sent to:

Don Lancaster
c/o Computer Shopper
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We regret that Don cannot answer personal letters from readers. All answers will be given in his column. If many people ask the same question, he will answer them as a group.

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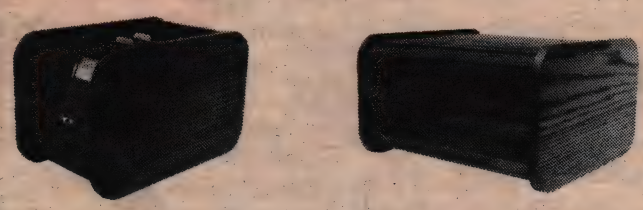

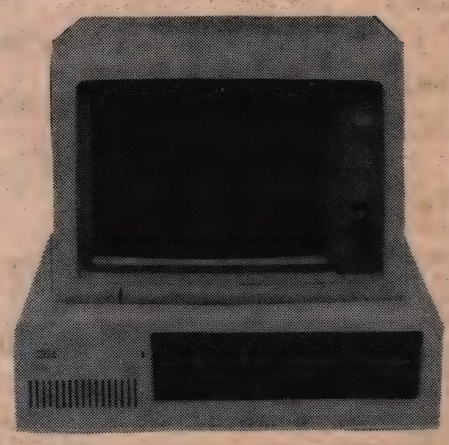

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Feedback

Continued from page 21

mally each enable a 2K ROM. If we force SELECT – to stay low, the only outputs that can be selected are Y0, Y2, Y4, and Y6. Y0 enables the keyboard and other built-in I/O; Y2, Y4 and Y6 each enable a 4K by 8 2732 EPROM, occupying ROM sockets to D0, E0, and F0, respectively. The 2k common ROM space enabled by Y1 can't be selected. Any peripheral device that uses this address space will not work. The interfaces that are thus excluded include the Hayes Micromodem][, Mountain Computer CPS card, most clock cards, 80-column board, parallel printer cards, serial cards, etc. The board may seem compatible, but don't push your luck too far.

There are also a couple of additional messy loose ends that can be tidied up, such as tying the unused inputs of half a 74LS139 decoder that isn't used to definite logic levels rather than letting them float.

The material quality of the two of these boards I've seen was quite high. If high-quality sockets, capacitors, etc., are used to populate one of these boards, there's no reason you wouldn't have a high-quality computer when you were done. But putting one of these things together isn't a job for beginners or people without access to test equipment and other necessities. A book such as THE APPLE II CIRCUIT DESCRIPTION is indispensable. A thorough understanding of how and why the Apple works is also required. You can get a true fully-compatible ersatz Apple from this board, but it takes time and patience, a lot of poking around, and some modifying. If you find chopping, channeling, and modifying P.C. boards unpleasant, or if you need step-by-step instructions to follow, then stay away from this one.

Mr. Larson's article implies that anybody with a soldering iron can put a computer together from a bare board and mail-order parts. With this particular Apple clone board, that's spreading the truth a bit thin.

My advice to beginners is to stick with a reputable kit manufacturer such as Heath and leave building computers from cloned bare boards to people with experience and a sense of adventure. You could also get the Digital Research (Texas) Ferguson "Big Board" kit, or the Xerox 820 bare board with EPROMs that B.G. Micro is selling for $30, and build a CP/M system. If you want an Apple clone, you can currently buy a new Franklin 1000 with a disk drive and some software for $700, and that's probably a better deal than you'd get building something similar.

—F. Kuechmann *(Vancouver, WA)*

Answer:

In response to Mr. Kuechmann's letter: my article was meant to be a description of the experience of a relative novice in building a computer at home, and not a technical how-to article. For example, my personal response to the ease at which I was able to solder the board I built was far from "ho-hum," although probably from an engineering standpoint there is nothing remarkable about solder pads, solder mask, or whatever. Likewise, the finishing of the computer case is not something state-of-the-art, yet I felt a sense of accomplishment in the final product.

My article does not imply that "anybody with a soldering iron can put a computer together from a bare board and mail-order parts." I clearly state in the article that there was a small group of people who built the computers together and that we had the advice and help of someone who was quite knowledgeable about computer hardware and software and who had actually built the same computer successfully. Three of the four boards required some troubleshooting to get them working properly, as stated in the article. Moreover, I mentioned that we had access to test equipment, including an oscilloscope. On the other hand, although I am not an electronics expert, I did build a computer from scratch; it was both fun and exciting to do; and, it was much easier than I had originally thought it would be. Thus, while there are probably people who might not be up to the task of building a computer, it is my belief that a whole lot more people are capable of doing so than the conventional wisdom would lead one to believe. My article tried to make this point. I also tried to make the point that there was nothing wrong with ordering supplies of all sorts from mail-order firms.

My article tried to convey the "sense of adventure" that Mr. Kuechmann mentions in his final paragraph. It was my hope that **Shopper** readers would find my account of some interest to them, and that the topic of computer hardware could be seen as less threatening to the average hobbyist than it might have previously been perceived. Unfortunately, it is just this sense of adventure and discovery that seems in danger of being lost as the computer revolution continues to grow. For those who are interested in reading about hardware adventure at a much more advanced level than that to be found in my own article, I highly recommend the following: Tracy Kidder's book, **The Soul of a New Machine**; Stephen Wozniak's article in the October 8, 1984 issue of **Infoworld**, "Chips and Dips"; and Lundell and Haugen's article in the October 1, 1984 **Infoworld**, Merry Pranksters." For a taste of what hobbyist hardware construction is like in another rapidly-evolving field—namely, hi fi—I recommend the highly regarded journal, **Audio Amateur.** Of special interest is Edward T. Dell's editorial in the September 1984 issue of that journal, entitled "Should Schematics Be Trade Secrets?"

—Tom Larson *(Tucson, AZ)*

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TANDY COMPUTERS

Tandy 1000 — Is It The End Of TRSDOS?

by A. Hewlett

When Tandy came out with the Model 2000, it was an obvious attempt to retain some of the business market which was rapidly going to MSDOS computers. Model 2000 was a superior computer that could run MSDOS software but it was not another IBM compatible clone. This had some good points and some bad ones. Model 2000 has better graphics and faster operation but it needs specially configured software and in spite of Tandy's urging and help, not all MSDOS software could run on it.

At the Tandy/Radio Shack exhibition in Houston this spring, Tandy introduced the Model 1200HD, an IBM XT clone. This new computer could run just about all the software that could be used by IBM compatible machines. It marked Tandy's entry into the PC compatible market and at the time it was introduced it was said that they also had a PC clone under wraps for a later introduction. As usual Tandy people would not comment on this rumor.

On November 8, 1984 the wraps were removed and Tandy announced the Model 1000 PC-compatible computer. The new machine provides capabilities equivalent to the IBM PC, plus graphics and sound enhancements, and it is priced more than $1,000 under the IBM PC list price. This is somewhat misleading because IBM PCs are now readily obtainable at discount prices, but Tandy 1000 comes with an impressive lot of bundled software.

The Tandy 1000 is a 16-bit 8088 based computer operating at 4.77 MHz just like the IBM PC. It looks like a PC but has a somewhat smaller footprint. The base price of the Tandy 1000 with 128 Kbytes and a single 360K disk drive is $1,199. It also includes built-in graphics in monochrome and color to 640 by 200 dot resolution, and a three-voice sound and music generator. A parallel printer interface, joystick ports and light pen ports are also included. Video outputs include both composite and RGB so that the computer could even be used with a TV instead of a monitor. Tandy is offering two video monitors as options with the computer. One is a 12-inch high resolution, green screen monochrome monitor at $159.95. The other is a 13-inch, nonglare color monitor at $549.95. Other options include a second disk drive at $299.95 plus installation, a Koala touch pad at $59.95, RS-232 Interface card at $99.95, and direct connect 300 baud modem at $179.95.

Tandy has gone MSDOS in a big way. First the Model 2000, then the IBM-XT compatible Model 1200HD and now the IBM PC compatible Tandy 1000. This new machine puts Tandy back into the ballgame and in fact in the first division.

The Model 1000 has lots of goodies at a low price. Read about it and what it means for TRSDOS support.

The modem card does not require a serial interface. The three-voice sound/music system is compatible with PCjr software. A small speaker is included, but the audio output can also be connected to your home audio system.

The on-board memory is expandable to 256 Kbytes and memory cards can be installed to bring the memory up to 640K. One problem with the three plug-in slots is that they will accept IBM compatible cards only to 10-inches long.

The keyboard has 90 keys and is the same as the one used in the Tandy 2000 and includes 12 function keys, as well as illuminated Shift and Num Lock keys. There are some other nice features such as a mechanical RESET button and a lighted power switch.

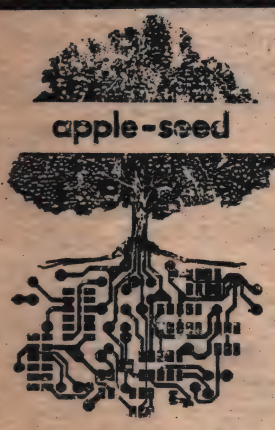
Tandy promises future add-ons such as a mouse input, hard disk interface, light pen and local area network card.

Tandy bundles MSDOS, GWBASIC, and Deskmate, a new integrated software package containing a spreadsheet, database, telecommunications program, calendar/alarm, word processing and electronic mail. The Model 1000 passes the compatibility tests of running Lotus 1-2-3, Flight Simulator and other IBM PC programs. Even IBM PCDOS 3.0 seems to run on the Model 1000.

There is one "Gotcha" on the Model 1000. The basic model comes with only 128K of memory. This keeps the entry price as low as possible. As with any IBM PC compatible computer there is very little

Continued on page 26

The Tandy Model 1000



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TRSDOS Topics

by Lon Andrews

The Grafyx Solution for TRS-80 4/4P/III

The Grafyx Solution is a combination of hardware and software that provides enhanced graphics capabilities for the TRS-80 Models III/4. The board fits inside the case of the TRS-80 easily and, combined with the software, provides 153,600 pixels arranged in 640x240 matrix for the Model 4 and 512x192 for the Model III.

Installation of the board is so simple anyone can handle it with no problems. Instructions in the manual are well written and easy to follow. Open the computer, remove the jumper between "E15" and "E14," and remove 1 screw from the main board. Drawings are provided to make sure that you get the right parts. Plug the board into the connector designated and tighten the attached screw. Hook the micro-clip to pin 2 of IC "U13" and you are ready to test the board. On the newer versions there are some differences so be sure to read the documentation carefully to be sure which model you have.

Testing can be done with the cover off if you are careful. Most advise against powering up with the cover and case off. The documentation calls for the uncovered test. If you do it this way, be sure to unplug the computer and wait one-half hour or more before replacing the cover and case. Either way, run the test as described.

With the high resolution graphics installed you will use GBASIC instead of BASIC for your graphics. GTEST/BAS puts the graphics board through its paces so that you can see it really works. There are several demonstration programs included with the board so you can see the capabilities of the GRAFYX SOLUTION. It was quite a shock to see graphics like this on the TRS-80! From GBASIC you are able to RUN the following demonstrations: OVALS/BAS, SPIRAL/BAS, ROSE/BAS, ROSE2/BAS, TRIANGLE/BAS, LILY/BAS, RIBBON/BAS, MOUNTAIN/BAS, FLOWER/BAS, FRAME/BAS, TUNNEL/BAS, CLOVER/BAS, CUBIC/BAS and DESIGN/BAS

These programs give you a good look at what the possibilities are with the graphics board installed. There are other programs that demonstrate more aspects of the various programming techniques used to produce high resolution graphics designs and pictures.

GBASIC interrelates with BASIC and makes it possible for the operator to perform a large number of functions with simple BASIC statements. Statements for the graphics board are preceded by "&" for the Model III mode and "@" in Model 4 mode. The high res screen can be turned on and off at will without affecting the program being run and both the normal screen and the high res screen can be displayed at the same time producing some very interesting results.

BASIC statements are used, such as:

```
10 FOR X=0 to 511
20 Z=@PLOT (X,X*192/512,1):NEXT
```

to draw a diagonal line across the screen. To turn off the High Res Screen-Z = @OFF and to turn it on Z = @ON. Z = @REV will reverse the screen and what is black will turn white and vice versa.

Four different plot densities are made available by the GRAFYX software. @MODE (n) enables the various modes with (n) being a number from

Continued on page 28

Tandy 1000
Continued from page 25

software you can run with only 128K. To also aid in keeping the low entry price, Tandy omitted the DMA controller chip from the basic model. You get this Direct Memory Access controller chip on the expansion memory board, so when you add your extra memory you better get the Tandy board. You need at least 256K as a minimum and 320K is safer for many programs.

The Tandy 1000, with its price, service support, extra features and bundled software, is a major contender for the title of PC of the year. Since IBM seems to be moving in the direction of more powerful computers and away from the floppy disk based PC, Tandy has made a very wise move into the MSDOS market. It is so successful that it is predicted that they will be completely into MSDOS by the end of 1985 and will only support TRSDOS as an old system with no new 8-bit computers offered. Sooner or later, Tandy had to make its move upward and the Model 1000 and Model 1200HD seem to be the vehicles for that move rather than the superior Model 2000. It will also be interesting to see how the Model 16 with its 68000 processor and Unix system fits into the Tandy future scheme of things.

In any event, this one computer puts Tandy/Radio Shack back into the ball game in a big way. ●

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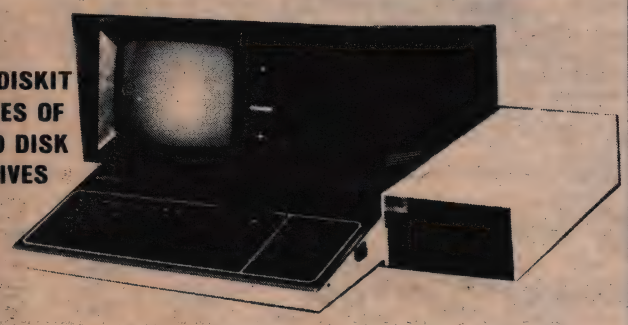

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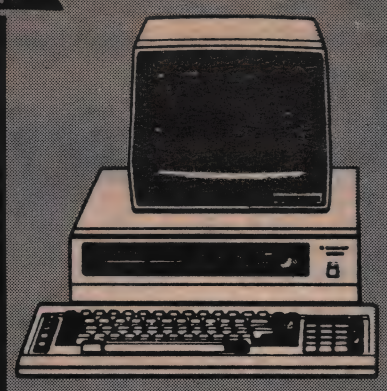

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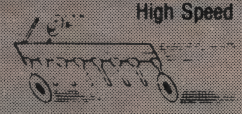

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TRSDOS Topics
Continued from page 26

1 to 4 representing the 4 modes available. (1) = 640x240 (512x192), (2) = 320x240 (256x192), (3) = 160x240 (128x96) and (4) = 160x120 (128x96). The figures in parentheses are for the Model III Mode.

There are about 25 commands that are usable in the high res graphics. They are simple to understand and use with little preparation. Drawing circles, lines, arcs and boxes is a matter of using the proper command with parameters that you set. @CIRCLE (X,Y,R,C) draws a circle with a radius of R, center at X,Y and color of points equal to C. Color isn't a mistake. It has a value from 0 to 2 where 0 clears the points, 1 sets them, 2 complements them. When drawing LINES and BOXES this value can be as high as 255 for a number of patterns. For example, (C = 3) produces a grey line.

@LPRINT (P) prints the current display. The value of P will vary with the printer you are using. We are using a DMP 2100 (P = 0) with beautiful results. The only drawback I have found is that this really uses up the ribbons. Our reinker is getting a workout since we started using the printer with the high res programs.

The GRAFYX SOLUTION can be used at three distinct levels of difficulty. Micro-Labs lists them in the probable order of usage. First, you will use the demonstration programs supplied and experiment with the utilities. There are other programs available to use with this board. These we will look at a little further on. Second, you will probably learn to write your own BASIC programs using the commands available to produce graphic displays and applications. Thirdly, and least likely for most, you can access the board directly by writing programs that read and write directly to the board.

There are various programs available now for the high res graphics board and more are being made available. Radio Shack has updated its Business Graphics Program to use high res. This brings up another point. Will the GRAFYX SOLUTION software run on Radio Shack's high res board? Yes and No. We have both boards and you can bet we tried the software on the R/S board right off the bat. It does run but has some glitches. Micro-Labs sells a GBASIC 3.0 for the R/S boards that will allow any of the GRAFYX SOLUTION programs to run without the glitches. Versions are available for TRSDOS 1.3, 6.1, LDOS, NEWDOS80 and DOSPLUS.

The documentation is complete and easy to read and understand. Programming examples are given to provide experience in developing expertise in writing your own programs. There is a section for advanced programming and mode control that many will never need but is welcome to those that have moved on to the higher levels of programming. Beyond that there is a section on assembly language programming for those that are so inclined to go on to address the board directly.

Micro-Labs has also included a section that compares the GRAFYX SOLUTION board to the R/S high res board. Programs will run on either board with some attention to detail. Model 4 and Model III boards differ in that the 4 is port mapped and the III is memory mapped. GBASIC is available for both 4 and III and Model III files may be loaded into the 4 with the SAVLOAD command. It is recommended that you use the Micro-Labs' GBASIC for the R/S board and eliminate translation between different Basics.

Now that I've got it, what do I do with it? As I said several programs are available that use the high res boards. From Micro-Labs you can get the following:

BIZGRAPH ($98.00) is a self-prompting program for data entry and plotting to display Line Graphs, Bar Chart, Pie Chart, Area Plot, Histogram and Scatter Charts. Data can be entered from

Continued on page 29

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TRSDOS Topics
Continued from page 28

keyboard. Visicalc, or any other package that uses DIF standard data interchange format.

DRAW ($39.95) a complete graphics/text editing package. By moving the cursor you can draw, design or add fine touches to an existing design/graph, etc.

MATHPLOT ($39.95) allows plotting of technical equations. Includes plots with polar notation.

3DPLOT ($39.95) X,Y,Z coordinates create complex three-dimensional figures. This one is fun! You can rotate, reverse and move these figures anywhere on the screen. Simple commands allow the figure to be viewed from any distance or angle.

SURFACE PLOT ($39.95) is again 3-dimensional and even more enjoyable. Draw a hill and turn it over and look inside! The program removes hidden lines automatically. Like the other programs, the images can be saved to disk or sent to the printer.

PCHAR ($19.95) allows creation of new character sets. These characters can be placed anywhere on the screen or saved to disk.

LET'S WRITE MUSIC ($49.95). Neat, readable music can be printed in the Model III mode. One line of music is displayed at a time with both treble and bass staffs. Most signs and symbols used in writing and composing music are provided.

BIORHYTHM & USA ($24.00) plots your biorhythm when given birth date and current date. USA presents a map of the United States with state and/or capital names displayed. Also has multiple choice and spelling modes to help your young'n study states and capitals.

JOY-MOUSE ($99.95) lets you connect the R/S Color Computer joystick and mouse to the Model III/4/4P. This is going to be my next acquisition simply because it sounds like a lot of fun.

G.I.N.A. ($98.00) software for the model 4/4P/III/I that allows a display of a window to a 65536x65536 dot tablet. The arrow keys are used to draw 2 or 3 dimensional figures that can be scaled, shifted or rotated in any dimension. Results can be printed in high res on various printer.

Also available are several games that access high res. One of these I am looking forward to is a Chess game that I believe is just coming on the market now. As time goes on, many more will be available. These graphics are too good to pass up!

Obviously, I am sold on the GRAFYX SOLUTION. I have yet to find something that I didn't like about the board or the programs supplied with it. I have several of the others listed and have enjoyed every one of them. They do take up a lot of disk space but I've been looking for an excuse to get a 10meg hard drive anyway. If you like graphics, you can't go wrong with Micro-Labs' GRAFYX SOLUTION.

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$199.95
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(214) 235-0915

Pro-ZCAT
A Disk Catalog Program for the Model 4

Pro-ZCAT for the Model 4 (Z-CAT for the III) is dedicated to the LDOS or TRSDOS 6.x user. No other DOS is recognized by either program. Written in machine language this is a very fast disk-catalog program. The program creates a file of directory file information for up to 255 diskettes and approximately 2000 file specifications. If you have more than that, you need to create another catalog file.

Menu driven, the program is easy to use. The name (Pack ID) of the disks becomes very important as it is used to isolate specific disks rather than numbers as some catalog programs use for ID. Individual files are found by name and/or extension.

The Model 4 program is supplied on diskette in TRSDOS 6.x or LDOS format. It is simply copied to your systems disk and you are ready to start cataloging your library. If you specify ZCAT (INV, SYS, PAGE = xx) you can catalog invisible and/or system files. Page = xx sets printer page length. Defaults are INV-off, SYS-off and PAGE-66. You can also use I,S,P as abbreviations.

After the program is called up the GETSPEC menu is presented. It calls for you to "Enter drive (0-7) or (BREAK) to Exit. Selecting a drive number will display all the files on that drive with a /CAT extension. This will show you all the ZCAT catalog files on that drive. At this point you will be prompted to enter the name of a catalog filespec. (BREAK) will bypass this option and return you to DOS READY. To read or create a file answer this prompt with a filespec. The extension /CAT is added by the program. Once a filespec is entered the master menu will be presented. PRO-ZCAT will read the file into memory if it already exists.

The MASTER MENU offers 9 options:
<A>dd disk to list
<U>pdate disk in list
<C>hange a disk's name
<R>emove a disk from the list
<S>earch for a file
<D>isplay a disk's files
<L>ist disks on file
<P>rint files in list
<E>xit to GETSPEC

Selection ?

CAT file: HARD10/CAT:0
Disks Cataloged: 15
Files Cataloged: 296
Maximum # of files: 2226

Selection of a function is simply a matter of pressing the corresponding letter. <A>

Continued on page 30

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TRSDOS Topics
Continued from page 29

scans a disk not previously scanned and adds the files to the catalog list.

You will be asked "Scan which drive (0-7)?". <U> allows you to scan an already cataloged disk in order to update. <C> changes a disk's name from within the program. <R> deletes all traces of a disk from the CAT file and resorts the file list. <S> prompts you to enter a search string. This string is then the basis for a search of the file list. Strings may use wildcards, partial strings, extensions or a complete file spec. All files in the list that match the string will be displayed. <D> displays the list of all the files on a particular disk. Each filespec has the following information following it on the screen: Protection level, logical record length, # of records, size, Mod date and disk name. <L> displays all the disks currently cataloged in the active file and how much free space is available on each. <P> produces one of three formats of printout: 1 - Files by disk order. All files and free space alphabetically sorted. 2 - Expanded file order. Alphabetically lists files, one across and 50 per page. Lists same information as <D>. 3 - Compressed file order. Alphabetical listing by file, 2 per line and 100 per page. Lists filespec, mod date and disk name. <E> exit to GETSPEC. You will be prompted to SAVE CHANGES ? Y/N. BREAK returns to DOS READY.

The program functions just as advertised. It runs very smooth with no problems that I could find. Be sure to SAVE THE CHANGES at the prompt or lose what you have done during a session. Since we use more than one DOS, this program isn't all that good for us. If you stick to LDOS and TRSDOS 6.x it just may be ideal for you. It is a good program and is well documented.

ZCAT (III) - $24.95
PRO-ZCAT (4) - $24.95
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Cornerstone DBMS Available For The Tandy Line Of Personal Computers

Tandy Corp. and Infocom, Inc. jointly announced that Cornerstone™, Infocom's relational database system which was recently demonstrated at COMDEX, will be available for the Tandy line of personal computers. Cornerstone will be sold in 430 Radio Shack Computer Centers and available through 780 Computer Plus Departments of Radio Shack stores nationwide beginning in February 1985. The product addresses the needs of an emerging market -- professionals who lack programming experience.

The Tandy version will operate on Tandy 1000, 1200 HD, and 2000 computers with a minimum hardware configuration of 256K of memory and two floopy disk drives (or one floppy disk and a hard disk drive).

Cornerstone will be simultaneously released for IBM and Tandy computer systems. This joint release is made possible by the software technology that Infocom uses in creating its highly successful interactive fiction, which is available on all popular personal computer systems.

Tandy is currently distributing several of Infocom's interactive fiction titles: Zork I for the TRS-80 Model 3; Seastalker for the TRS-80 Color Computer 2; Planetfall and Witness for the Tandy 2000; and Cutthroats for the Tandy 1000/2000 series.

For more information contact Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138.

Mention that you read about it in Computer Shopper. ●

New Version Of Color Computer II

Speaking of newer and newer versions of CoCo II: The very latest is 26-3136A and it has a totally revised board. Once again, TANDY has pulled the rug out from under third party suppliers. For instance, non-standard Texas Instruments RAM chips are installed.

The 16K computer uses TMS4416's which are 18 pin 4x16's so only 2 sockets are required, not the 8 sockets that we are accustomed to. Because these chips require a 256 cycle refresh (vice 128 cycle) a new SAM chip is required, a 74LS785. (The old one was a 74LS783). The VDG is the same but a new VDG with true lower case will be in the 26-3136B version of CoCo II (and in CoCo III).

A new 28 pin ROM (vice 24 pins on the old version) is used for Color Basic and Extended Color Basic (yes, one chip for both the Basic's). It is version 1.3 now. It's also soldered in rather than socketed. If a non-Extended 16K computer is made with this board it will be supplied with a 24 pin Basic chip plugged into a 28 pin socket, or maybe soldered into the location.

There are twelve pin connectors near the RAM chips and some jumpers marked "128K RAM" so we can expect some kind of a satellite board next year for that upgrade. (The 64K upgrade may be via satellite board as well.) The 74LS244 buffer has been changed to a 74LS623.

Finally, the disk controller has been completely redesigned. The part number (AX7980) is the same but there are fewer chips used. They are: A new Western Digital 1773, which is a 28 pin controller chip, and 7 others (LS74, LS14, LS139, LS02, LS273 and two LS16's). The new controller clock speed is 16 MHz vice 10 MHz.

For more information contact Spectrum Projects, P.O. Box 9866, San Jose, CA 95157-0866.

Mention that you read about it in Computer Shopper. ●

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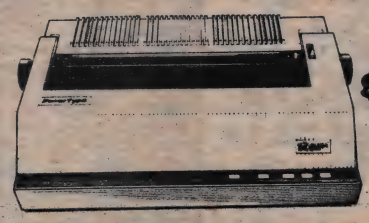

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IBM-MS DOS

ASCII To WordStar Conversion Utility

by Andrew Fried
(MCI #116-7368)

Several months ago, I published a small program written in Pascal which cleaned out a WordStar document file. While the program had been intended to show how simple do-it-yourself projects can be, the response to the short program was great. My thanks to all of you that took the time to write to me! Most of you that wrote indicated you enjoyed learning the logic of how I developed the program, as much as the program itself.

One such letter I received was from a student in a California college majoring in Computer Science. He wrote to tell me that he had wanted to make the program work in reverse; he wanted to take an ASCII file and convert it into a WordStar document file format so that he could use the formatting features of WordStar. While WordStar can work with ASCII files, it cannot take an ASCII file and perform much in the way of reformating.

I thought that this might make a natural follow-up project to the original one. Before I get into the nitty gritty, though, I once again want to stress one thing, because this program is being created as an example and not as a product for commercial distribution, it may or may not be complete. I urge all of you that come up with enhancements to share them with others (and send me a copy as well, either to my MCI number above or to the Computer Shopper). This is how public domain software evolves.

Define The Project

Before you start on a project such as this, you must decide exactly what you want to accomplish. While this sounds awfully simple, many programs go astray because the programmer forgot what he was trying to do. The goal is to take an ASCII file (which usually consists of printable characters from Chr(32) to Chr(127)) and convert it into a WordStar document file. You should assume that any characters that are undefined (Chr(128) or above, or are characters which are non-standard graphic characters) and any control characters found in the ASCII source code should be stripped prior to conversion.

A few months ago, Andy Fried gave you a program to convert WordStar files into ASCII. Now he has submitted another useful program to convert ASCII files into WordStar format. Written in Turbo Pascal, this program can also be obtained in a compiled version from Andy if you are one of the few PC'ers who haven't bought Turbo Pascal. Andy also explains how the program works.

This explanation is incomplete; you haven't described what the WordStar document file must consist of. For this, you have to do a little investigative work.

Super Snoop

In order to complete the problem definition, you must learn what the file conversion must accomplish. I do not think you will find any books published by MicroPro that explain what WordStar does to the file in order to work with it, you are left to your own resources to find this information. To begin with, you must make a few observations about the way WordStar operates under the document mode. If you have used WordStar, you know that when you type something, WordStar will add blanks in order to justify the text. We also know that if you change the margins or add text, those blanks are removed or new ones added to accommodate the line length. This tells you that WordStar is able to differentiate between real

Continued on page 32

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ASCII

Continued from page 31

spaces and padded spaces. Therefore one of your tasks will be to discover how WordStar knows the difference.

Second: You realize that WordStar must have some way of knowing the end of a line once it reformats the text. Hard carriage returns, or the ones created when you press enter (such as at the end of a paragraph) must be somehow different because WordStar never gets the two confused; a hard carriage return always indicates an end of line and linefeed, whereas the soft returns, which are added by Wordstar, can be changed anywhere by the program. So your next task is to identify the difference between the hard return and the soft return.

Third: You can readily see that when WordStar hyphenates words at the end of a line, it can distinguish that so called soft hyphen from a hard hyphen. You can see that soft hyphens occur only at the end of a line; a hyphen occurring anywhere else in the line must be considered as a hard hyphen.

FUN, isn't it!

I don't know about you, but I'm having fun! If you find all of this about as interesting as watching paint dry, I suggest you skip to the bottom and go right to the program because you are going to be doing some serious hacking in a few moments.

How can you see what WordStar is doing to the file? Simple! Take a disk utility program that allows you to look at physical sectors on a diskette, such as Norton Utilities, and look at the actual stuff written by WordStar!

What you need to do is to enter a small amount of text into a WordStar document file. In this manner, you will know exactly what the text was originally and see exactly how WordStar changed it. The purpose of doing this is to discover the following:

1. Does WordStar add anything else to a text file?
2. What does WordStar do to actual text?
3. How does WordStar handle spaces?
4. How does WordStar handle soft returns?
5. How does WordStar handle soft hyphens?

Lets Experiment

If you can discover the answer to all of these things, you will then be able to design an algorithm for our conversion. OK, lets format a disk (no system is needed) so that there is absolutely nothing on the disk but what you want there.

Now, boot up WordStar in drive A: and leave the blank disk that you just formatted in drive B:. Be sure to enter the document mode! OK, you're doing great so far.

Recall that you need to have WordStar do a few things so that you can see precisely how it is doing things. In order to accomplish this, you need to type a few larger words that will force WordStar to not only add spaces for justification but will ask for a manual hyphenation. This will also produce a soft return at the end of the line for our examination.

Lets type the following six lines into a document file: "Hopefully I-will-learn something from the article appearing monthly in the Computer Shopper." I think this is enough typing...

Ok, now go back to the beginning of line that starts with "Hopefully" and hit a

Continued on page 33

```
(* ********************************************
   ********************************************
   ***   ASCII to WORDSTAR CONVERSION  UTILITY   ***
   ***        Written  by  Andrew  Fried  12/84   ***
   ***              for   the  Computer   Shopper   ***
   ***    MCI 116-7368  CompuServe  75545,1116   ***
   ********************************************
   ******************************************** *)

PROGRAM ASCII_To_Wordstar_Conversion;
CONST
Lf: CHAR = #10; (* Linefeed *)
Cr: CHAR = #13; (* Carriage Return *)
EOF_FileMark : CHAR = #26; (* End of file mark (^Z) *)
TYPE
Filvar      = STRING[14];   (* File variable name *)
LineOfText  =  STRING[255];(* The line  to  be converted *)
VAR
SourceFile,
DestinationFile  :  Filvar;   (* Names of files *)
ASCII_Source     :   TEXT;    (*  Our ASCII Source file *)
WS_Target    :   FILE  OF CHAR; (* Our destination Wordstar file*)
EditLine     :  LineOfText;     (* The actual line variable  *)
FUNCTION FileExists(Name_of_File:FilVar):BOOLEAN;
VAR
    The_File                : FILE;
BEGIN
    Assign(The_File,Name_of_File);
    (* $I-*)
    Reset(The_File);
    FileExists:=(IOResult=0);
    (* $I+*);
    Close(The_File);
END;
FUNCTION NewValue(Letter:CHAR):CHAR;
BEGIN
    If Ord(Letter) < 128 then NewValue:=Chr(Ord(Letter) + 128)
    else NewValue:=Letter;
END;
PROCEDURE Enter_File_Names(VAR Source,Target:Filvar);
VAR
    TempSource,
    TempTarget              : FILVAR;
BEGIN
  Repeat
    Writeln;
    Write('Enter the name of your source file : ');
    Readln(TempSource);
    Writeln;
    Write('Enter the name of your target file : ');
    Readln(TempTarget);
 Until (FileExists(TempSource) AND Not FileExists(TempTarget));
 Source:=TempSource;
 Target:=TempTarget;
END;
PROCEDURE Reconfigure_Line(Sentence:LineOfText);
CONST
    Blanks                  : Set Of Char = [#32,#160];
    SoftReturn              : CHAR = #141;
VAR
    Len,
    Index                   : INTEGER;
BEGIN
   Len:=Length(Sentence);
   For Index:= 1 to Len do
     Case Sentence[Index] of
       #13          : Sentence[Index]:=#141;
       #45          : If Index = Len then Sentence[Index]:=#31;
       #32          : If Sentence[Index-1] in [#32,#160] then
                      Sentence[Index]:=#160 else Sentence
                      [Index-1]:=NewValue(Sentence[Index-1]);
       #128..#255 : Sentence[Index]:=#0;
   End;
 For Index:=1 to Len do If Sentence[Index] <> #0 then
 Write(WS_Target,Sentence[Index]);
 Write(WS_Target,SoftReturn,Lf);
 END;
 BEGIN
  Enter_File_Names(SourceFile,DestinationFile);
  Assign(ASCII_Source,SourceFile);
  Reset(ASCII_Source);
  Assign(WS_Target,DestinationFile);
  Rewrite(WS_Target);
  Writeln;
  Writeln('A dot will appear for each source line that
  is processed.');
  Writeln;
  Write('>>> Standby. Conversion in progress...');
  While Not EOF(ASCII_Source) do
     Begin
     Readln(ASCII_Source,EditLine);
     Write('.');
     Sound(1000);
     Delay(10);
     NoSound;
     If EditLine = '' then
          Begin
               Write(WS_Target,Cr);
               Write(WS_Target,Lf);
          End
          Else Reconfigure_Line(EditLine);
     End;
  Write(WS_Target,EOF_FileMark);
  Writeln;
  Writeln;
  Writeln('>>> Finished conversion.');
  Close(WS_Target);
  Close(ASCII_Source);
END.
```


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ASCII
Continued from page 32

control B (reformat command). You should see a message asking if you want to hyphenate the word monthly. Press the '-' key. This will add our soft hyphen into the text (sneaky, huh!). Now, lets review the text. We have entered six lines, so you can readily see what a forced end of line looks like (a hard carriage return) as well as the soft return (created by WordStar after the soft hyphen in the word monthly). We will also have some padded spaces added somewhere in the text, in my machine it occurred after the word "Hopefully". Now you are ready to examine the disk.

My Secret Revealed

Using Disklook from the Norton Utility, examine the first sector of your text file. You will discover that WordStar has, in fact, modified what you typed. Lets look closely at the results. The first byte is hex number 48 (decimal number 72). Remember, Disklook is displaying hexadecimal numbers! If you take out your handy dandy ASCII chart (or use Sidekick) you'll soon discover that Chr(72) is, in fact an "H" (our first letter of the sentence). So you know that WordStar doesn't append anything to the front of the file.

Now continue scanning the text, and you will see that the last letter in "Hopefully" is gone. In its place is hex character F9 (which is the same as Chr(249)). Now you need to do a little interpretation. We know that the character that belongs there is the "y", which is Chr(121) or hex 79. Simple subtraction will reveal that WordStar took the last character in a word (defined as the last character before a space!!!) and added 128 to its ordinal value.

If you are a programmer, you will realize that if you take a byte, the first bit (MSB or most significant bit) has a value of 128. In other words, WordStar merely took the byte that represents the last character and set the first bit high, resulting in a character whose ordinal value is exactly 128 greater than it was originally. Boy, are you smart!

This is the key to programs that clean WordStar files; if they find a character whose ordinal value is greater than 128 they merely strip (or mask for you sophisticated hackers) 128 off the character. In other words, in the case of the little "y", WordStar simply took the letter "y" and added 128 to its bit representation (Chr(121 + 128) equals Chr(249) or hex F9).

One Down, Three to Go

What you have discovered is that when you do a conversion from ASCII to WordStar, one of the first things you must do is to take the last character in each word and add 128 to its ordinal value. That is a simple task, merely take the character (actually its byte representation) and OR it with 128. Simply put, you take the character and add 128 to its representation.

You now need to turn your attention to spaces. You can see that spaces are represented by Chr(32) (20 hex). But after the "y" in "Hopefully" you see a space, however it is represented by hex value AO (Chr(160)). Bingo, you now discovered how WordStar can arbitrarily add spaces and keep track of them; it uses Chr(160) for all of the padded spaces it uses. I guess it simply deletes them and re-creates them when formatting. So, your next task in converting an ASCII file into WordStar is a little more complicated; you leave the first blank after each word alone, but then take all subsequent blanks, up to the next actual character, and change them to Chr(160).

WordStar and Hyphens

This will be easy to solve. You entered two hard hyphens in our text "I-will-learn". Looking at the sector, you discover that WordStar left them alone, the hard return is properly represented as Chr(45) hex 2D.

Looking at the end of the line, however, you see the hyphen created when you reformatted the text is represented as Chr(31) or hex 1F. So, you know that hyphens appearing inside the line of text should be left alone, whereas characters appearing at the end of the line should be converted to Chr(31). One flaw here; if the ASCII text file had a hard hyphen at the end of a sentence that was supposed to be there, the cleaning program is going to end up removing it. It isn't a magic program you know... END OF LINES.

Your final task is to see how WordStar handles the end of lines. Remember, you will be

Continued on page 34

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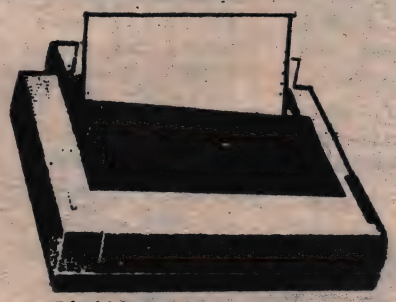

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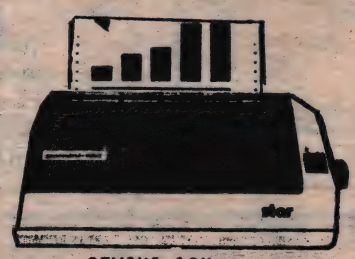

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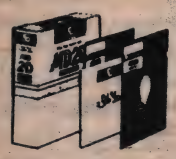

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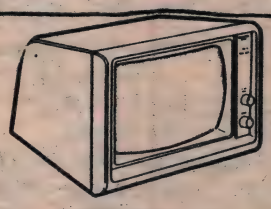

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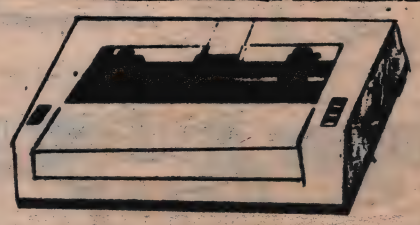

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ASCII
Continued from page 33

taking an ASCII file and trying to convert it to a form that will allow WordStar to fully reformat it. As all ASCII files have end of lines indicated by the carriage return/line feed sequence (Chr(13) Chr(10)), you must somehow change these.

Once again, refer back to your disk. Look after the period in "Shopper." and you will see two hex bytes OD and OA (equal to 13 and 10). That is our normal CR/LF sequence so you may assume WordStar handles all hard returns the same way they would be represented in an ASCII file.

You now know that WordStar did create an end of line after the hyphen in the word "mon-". Look at the following bytes and you will discover an 8D-OA sequence now exists. The OA (Chr(10) or control J) is the correct symbol for linefeed, however 8D is now being used as the carriage return. You have now filled in the final piece of the puzzle, you must convert all ASCII end of lines with the Chr(141) Chr(10) sequence (hex 8D OA). One problem will arise, how will you know when to end the paragraph with a hard return?

That is a matter of speculation; for almost all situations a blank line consisting of nothing but a CR/LF sequence is a clue that the paragraph has ended.

Whew, We're Ready To Program

I sure hope you have learned something so far. Now, for the finale, I am going to present the program undocumented. I think you should look at the source code, and see if you can figure out how I did what I did!

I'll Send You The Program

While I wrote the program in Turbo Pascal, you might not have a Turbo compiler. If that is the case, or if you are too lazy to type the source code I will, as a service to my readers (and for ten bucks to cover the disk, mailer, postage, time spent copying it), send you a disk containing:

A reprint of this article in WordStar format.

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Source code for the program (already typed in).

The compiled program.

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ERRATA

In the November issue of Computer Shopper, Andy Fried, writing about Sidekick from Borland International, referred to this program as having a new 2.0 Version. This is an error on Andy's part. Sidekick is now in its 1.1 Version. We regret any inconvenience caused to our readers and to Borland International. Andy loses 100 experience points and half his treasure. That'll teach 'em.

IBM AT Tips

by Barry Vigraham

(Reprinted from the New York Amateur Computer Club, Inc. Remote Bulletin Board)

Here is some information about the AT which you may find useful to talk about. I have been using the AT for approximately four weeks, and I find this machine to be a well engineered one. The AT uses floppy disk (HD) manufactured by YE-DATA model YE-380. The 20 MB hard-disk in my system is manufactured by Computer Memories.

There is a pin in the I/O channel for faster memory boards which uses *zero* wait states. Watch for some 256K chip (70 nano) memory boards to even make the AT scream louder. AT's current design will support up to 15MB RAM. AT's integrated controller has some nifty features. It runs floppy disks using DMA but not *hard disk*. The transfer rate between memory and controller's sector buffer is about 2MB. The 80286 can be changed to a faster model by changing both the chip and the crystal.

Note the system clock is independent. The Asynchronous/Parallel adapter uses new UART NS 16xxx instead of NS8250. The Clock/Calendar/NVM chip is being made by Motorola and it is a 146818. It contains 64 bytes of CMOS RAM. Fourteen bytes of this are used for clock/calendar information. The rest are being used or will be used for configuration information. No more switches. There is even CRC to check the validity of the RAM contents.

More for techies. Now there are seven DMA channels instead of three. Moreover, DMA channel is no longer used for memory refresh. Why you may ask? Ch. 0 of the DMA chip can be used to do memory transfer (which wasn't available in the PC and PC/XT). This is probably needed to support new IBM graphics boards. Since you may have to do large amounts of memory to video RAM, DMA channels 5,6,7 support 16 bit data transfers and only on even boundaries. The IRQ2 line on the old PCI/O bus is now IRQ9. Why? Now there are two 8259 interrupt controller chips cascaded. IRQ2 is used for cascading. But the BIOS ROM would switch to IRQ2 to maintain compatibility.

Old Serial Cards in AT

Here it is. You can use your old SIO cables and old ½ size serial I/O cards from your XT in the AT if you do the following:

There is a jumper called "jl" in the middle of serial card. Just cut it and install it in your AT and you are in business. Why? Well, this jumper is used to drive I/O pin B8 in the XT I/O bus. This pin, when activated, informed some circuits in the system board saying that this card is in the 8th slot and needs more bus drive current, but in the AT this pin has been re-assigned to tell the system board not to insert any wait states (zero wait state).

Well, there is your answer. Note: Some old full-size cards may not put their signal on B8, hence you don't need to meddle with it.

Good hacking.

AT&T PC 6300 Switches

Switch-0 close to the fan...

1-off;2-on;3-off;4-on = 128K on mother

1-on;2-off;3-on;4-on; = 256K on motherboard

1-on;2-on;3-off;4-on; = 512K total (256 on MB + 256K on I/O bus

Continued on page 36

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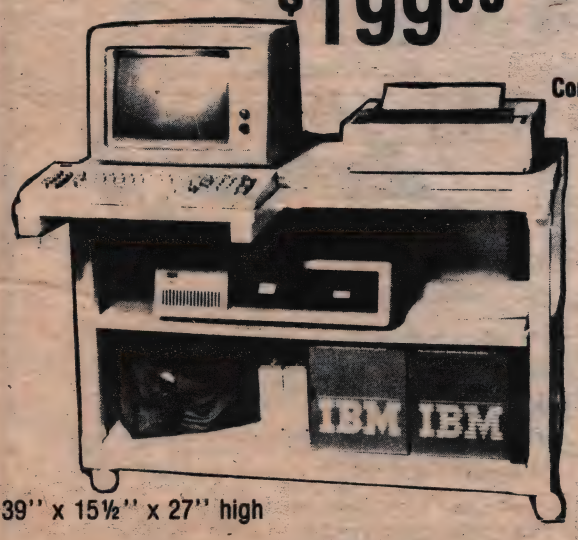

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IBM AT Tips
Continued from page 34

1-off;2-off;3-on;4-on; = 640K total (256K on MB + 384K on I/O bus
1-off;2-off;3-off;4-on; = WE 256K chip (no wait) on motherboard
5-off; = 8087 present (must be an 8 MHz version)
5-on; = 8087 not present
6-on; = 8250 SI/O chip
6-off; 8350 SI/O chip
7-?; = not documented...
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7-on;8-on; 1 floppy disk drive present
7-off;8-on; 2 floppy disk drive present
3-off;4-on; 2 hard-disk units present
3,4,7,8-on; = drive 0 has 2 heads, 360 cylinders
1,2,5,6-on; = drive 1 has 2 heads, 360 cylinders
7,8-on; = drive 0 has 4 heads, 306 cylinders
5,6-on; = drive 1 has 4 heads, 306 cylinders
3,7,8-on; = drive 0 had 6 heads, 306 cylinders
1,5,6-on; = drive 1 had 6 heads, 306 cylinders
4,7,8-on; = drive 0 has 8 heads, 375 cylinders
2,5,6-on; = drive 1 has 8 heads, 375 cylinders

This is posted for general usage with a disclaimer that there is no guarantee that the switch settings shall remain the same. So, please...your judgment in distributing this information.

AT Accessories

Some more information about the IBM PC/AT...

Type 2 hard-disk for AT can be obtained from Computer Memories located in Chatsworth, California. Their phone number is 213-709--6445. The part-ID is CM-6426-S. Of course the price is cheaper than IBM's.

The high-density floppy disk drive can be obtained from Task Technology Inc., located in Santa Clara, California. Their phone number is 408-246-1881. The part-ID is Mitsubishi M-4854-5¼. Also available is an 8" version with the same interface for die-hard hackers. The new UART is made by National Semiconductor and is sold through their nation-wide representative organization. The part-ID is 16450NS. The new Clock/Calendar chip is made by Motorola and this is also available from their nation-wide representative organization. The part-ID is M146818.

Good hunting with the AT (catch those bugs!) ●

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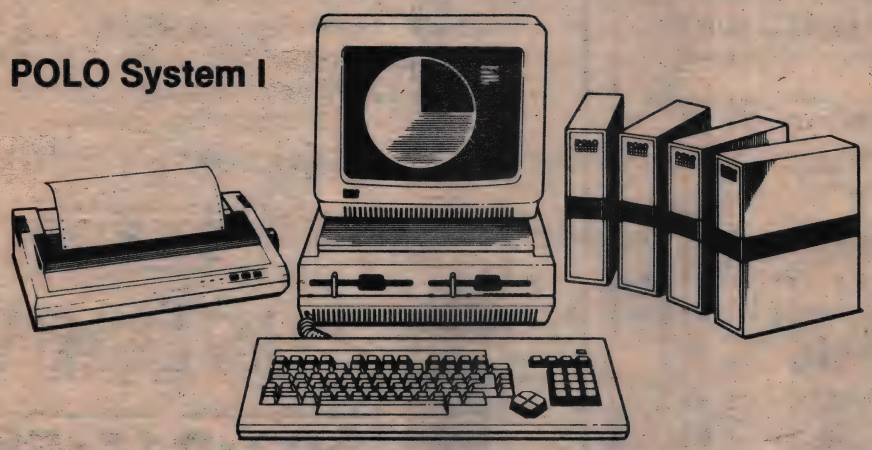

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Ericsson Information Systems Introduces MSDOS PC

The world's first Ergo-Intelligent™ series of IBM compatible personal computers, offering users a sophisticated package of advanced ergonomic features, has been introduced by Ericsson Information Systems at the Fall 1984 Comdex computer trade show.

In announcing the immediate retail availability of the Ericsson personal computer, the company also outlined plans to introduce an integrated series of ergonomically advanced office automation products. In the next two years, over 30 data processing and telecommunications products, from data terminals to office furniture, will be distributed by the company through third party computer dealers.

Leading the way for these products is the Ergo-Intelligent™ Ericsson personal computer series, an IBM compatible product line that is backed by a $300-million corporate investment in the science of ergonomics. The result is a personal computer completely designed with the user in mind.

The Ericsson personal computer has been designed to eliminate many of the specific complaints often voiced by computer end users, including back pain, eye strain, headaches, shoulder aches, and dizziness. The system features enlarged alphanumeric keys, nonglare monitor screens, adjustable display stands, modified character design and spacing as part of its standard package.

Introducing Ergo-Screen™ Monitors

The system is available with either a 12" monochrome or 12" color monitor. The monochrome display is completely non-glare with restful amber characters positioned against an ergonomically correct, low fatigue background color.

'Ghosting', a common characteristic found on many computer monitors, has been completely eliminated in the Ericsson personal computer. Visual display sharpness is increased on the Ergo Screen monitor because the unit features an extremely high resolution of 640x400.

The company has improved the quality of character display by modifying the typeface employed. As a result, each character (including those that are difficult to distinguish, such as "Q" and "O") can be read clearly and immediately, eliminating strain.

Unlike many other monitors, the Ericsson Ergo-Screen monitor allows the user to display words and graphics at the same time as a standard feature.

Also standard is the totally adjustable Ergo-Arm™ display stand that allows the user to completely control the height and the angle of screen viewing.

Finally, the irritation of too many terminal wires has also been eliminated, because the monochrome monitor is powered from the system unit through the signal cable.

Ergo-Touch™ Keyboards

The Ericsson keyboard, unlike IBM's, features full sized, broader spaced alphanumeric keys that help to reduce errors committed by end users 'mishitting' keys. The full sized keys also reduce the amount of time it takes an inexperienced operator to adjust to the Ericsson system.

Furthermore, the Ericsson keyboard is 20% more compact than the IBM keyboard and less than half the weight. Noise has been reduced substantially. Indicator lights are built in to the NUM lock and SHIFT keys, and the numeric keypad has its own Enter-Key.

Ergonomics Applies To Everything

Every component of the Ericsson personal computer has been designed from the viewpoint of its ergonomic impact. The system console, for instance, can be stored vertically beneath the user's desk in a special ergonomic mount.

The system's On/Off switch is positioned on the front of the console and not in the rear, where it can be annoying to find. A special high quality

Continued on page 38

Ericsson Information Systems Introduces IBM Compatible PC

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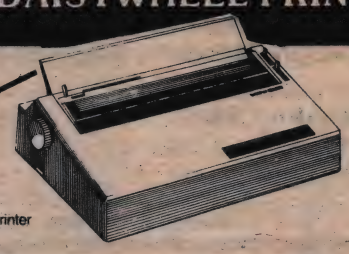

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Ericsson Information Systems
Continued from page 37

cooling fan is employed in the Ericsson system, reducing the level of overall noise.

Upgrading components is just as ergonomic. If the user decides to upgrade from two floppy disk drives to the company's 10MB hard disk drive, he can do so without an outboard unit. He simply slides one disk drive out and the hard disk drive in.

The combination of complete IBM compatibility and ergonomic benefits will clearly separate Ericsson from the competition that already exists in the glutted IBM compatible marketplace.

For more information contact Ericcson Information Systems, Greenwich Office Park 1, PO Box 2522, Greenwich, CT 06836-2522.

Mention that you read about it in Computer Shopper. ●

UniForm-PC Software Compatible Between MSDOS & CP/M

UniForm-PC software from Micro Solutions, Inc. offers new levels of compatibility for businesses that use a mixture of 16-bit IBM PC, PC-XT, PC-AT or compatibles and 8-bit or 16-bit CP/M micros. With UniForm-PC, an IBM user can utilize the data diskettes from any of more than 80 CP/M computers, without the time and trouble of mere file copy programs. UniForm-PC provides this previously unavailable diskette compatibility by transforming one of the floppy disk drives of an IBM PC or AT into a CP/M drive to read, write, copy and format data diskettes, as well as copying data from the IBM disk to the CP/M disk.

An AT equipped with a high-capacity drive only can read, write, copy and format 96 TPI disks, as well as read 48 TPI disks. The addition of a 48TPI drive lets the user utilize the full capacity of UniForm-PC.

This unique and innovative utility program provides 100% compatibility between IBM PC DOS software programs and 8-bit or 16-bit CP/M data diskettes. This means that for the first time, users who have both IBM PC and CP/M micros can interchange and use data diskettes without major added expense. Both standard ASCII and other data files can be moved between operating systems, without altering the integrity of the file. A few keystrokes transform the floppy drive or format the diskette. Operating system procedures are unchanged, making UniForm-PC completely transparent to the user.

Menu-driven, UniForm-PC is called up with standard DOS commands. A series of helpful prompts guides the first-time user through its capabilities. Once familiar with the program's operation, all commands can be given as a single line entry from the DOS prompt. There is also an on-line help facility, accessed by a single keystroke, describing all of UniForm-PC's options. Concise documentation fully explains the program's capabilities.

UniForm-PC provides clearly explained warning messages. When an error is detected, the system responds with an audible two-tone signal, as well as an error message on the status line. During diskette formatting, UniForm-PC auto-

Continued on page 40

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Shpg. Wt. 4 Lbs. SPL-85C-35 $175.00 each, 2/$325.00

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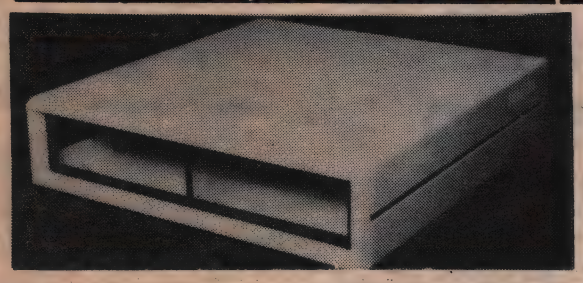

Want a power supply to fit this case? See below!

Dual 1/2 Height Disc Drive Case

We have a small quantity of very well made, stylish, aluminum cabinets which will house the above 1/2 height Mitsubishi drives, or any other 1/2 height drives for that matter. They were originally intended to house a CPM based system, 2 disc drives and a Boschert power supply. The cabinets come with top, bottom, front bezel and rear panel. Internal measurements are 13-3/8" deep x 13-5/16" wide x 3-1/4" high. They will fit some of the single board computers which are currently on the market. Original cost on these cabinets was over $180.00 in large quantities.
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This Boschert power supply, made by one of the most respected names in the business, was designed specifically to fit into the above case along with 2 of the above 1/2 height Mitsubishi disc drives and a single board computer. Input is 115/230 jumper selectable, with surge protection by 2 MOV's and a 3A fuse! Outputs are +5V @ 5A, +12V @ 2A, −12V @ .5A, and −5V @ .5A. They are very well designed, light weight and compact. Each one new, unused. Most are in the original factory cartons, guarenteed OK and up to snuff. List on this power supply is over $100.00.
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SPECIAL DEAL on the above components:

The drives, case and power supply above are available separately or can be purchased as a package. Buy 2 Mitsubishi 4853 disc drives, 1 dual drive cabinet and 1 Boschert power supply and save $15.00 off the already low price of $415.00. Others are charging over $650.00 for units that are similar in storage capacity, but not near the quality of our unit. We have seen these bare drives alone upwards of $269.00 each in other publications. You get 2 megabytes of highly reliable storage for only $400.00. The supply of these parts is limited, so order early. To order, ask for special disc drive deal on page 1 of the catalog.
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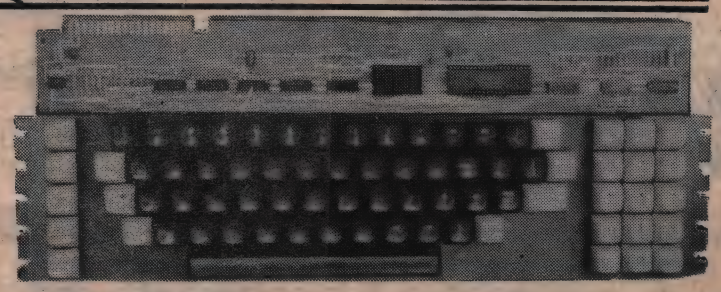

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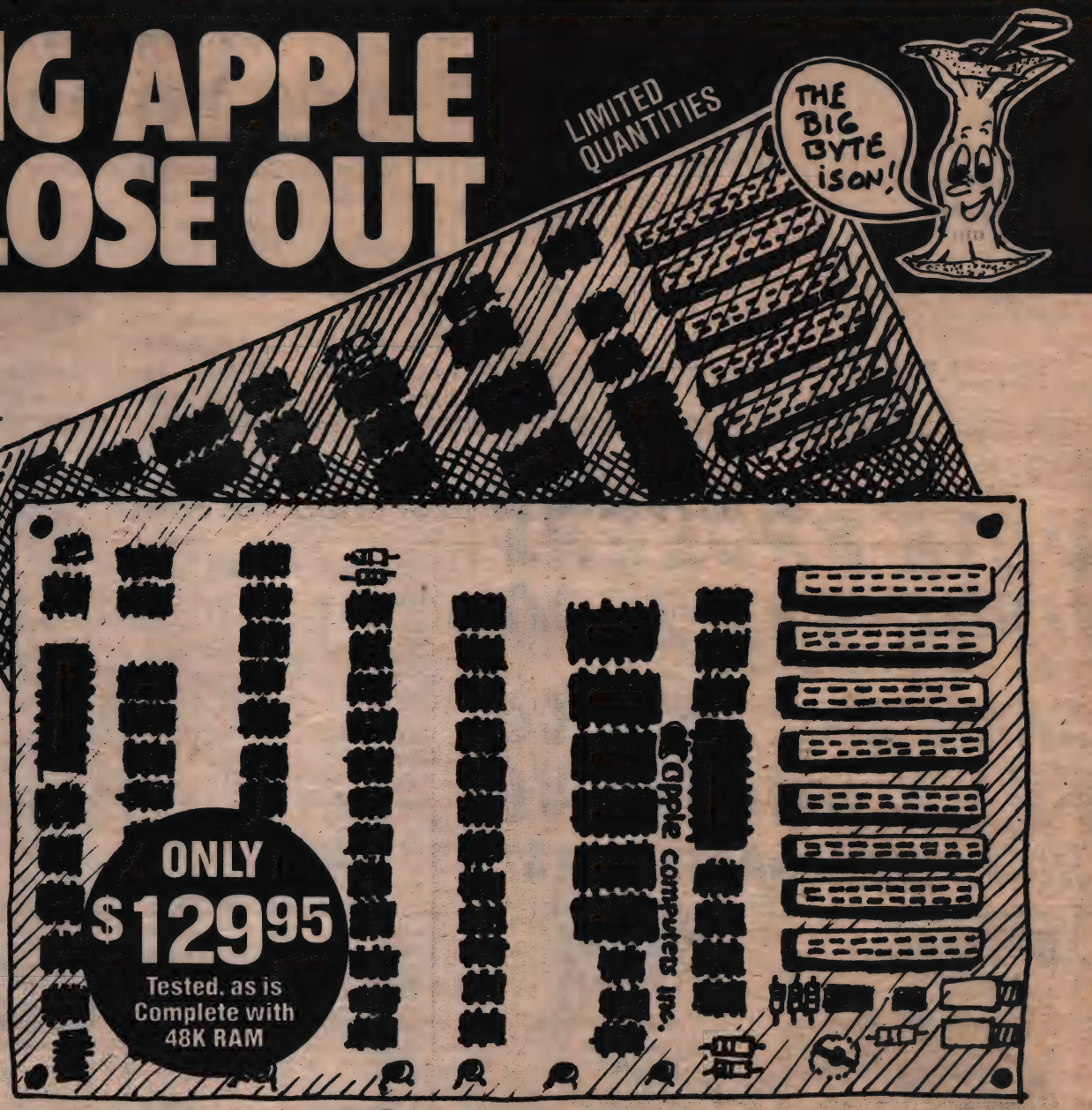

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UniForm-PC Software
Continued from page 38

matically checks the integrity of each diskette track and displays the number of bad tracks, if any.

UniForm-PC supports a wide variety of diskette formats and sizes, including 96 TPI or 48 TPI disk drives. When used with the appropriate disk controller, either 5-inch or 8-inch floppy diskettes may be utilized.

The program runs on the IBM PC, PC-XT, PC-AT or 100% compatible microcomputers under PC-DOS Version 2.0 or higher. Recommended memory is 128k, although UniForm-PC utilizes less than 24k of RAM space. Access to two floppy disks or one floppy with a hard disk is required.

Micro Solutions also offers UniForm CP/M, a similar product for use with 8-bit CP/M machines, available in more than 10 different machine-specific versions.

UniForm-PC retails for $69.95 and is available from dealers nationwide. For more information, contact Micro Solution, 125 South Fourth Street, DeKalb, Il 60115.

Mention that you read it in Computer Shopper. ●

Two New Switches Add Versatility To PMI Line

To ease changing computer peripherals and to safeguard expensive hardware systems, more and more companies are using A/B switches. Some time ago Peripheral Marketing, Inc. successfully introduced a 20 conductor RS-232 A/B switch (Model 220) at $99.95. Although this product was an instant success it was limited to serial RS-232 applications only. Recently, PMI has extended this product line with two new switches, models 225 and 236.

All three switches have computer grade PC board construction with gold or silver plated contacts for optimum performance. They also feature easy-to-use push button actuators, low profile brushed aluminum exteriors and a five-year limited warranty.

A/B Switch by Peripheral Marketing Inc.

The model 225 (priced at $129.95) has three female DB-25 connectors and switches 25 lines. In addition to handling all serial RS-232 applications, it is compatible with the IBM® PC parallel interface. The 236 ($149.95) has three female Centronics connectors and switches all 36 lines. This switch handles all Centronics parallel switching applications, and is compatible with all mini and micro computer systems.

In general, any two computers, CRTs, printers, modems or other devices can be switched to a common channel. More complex switching arrangements are also available by cascading multiple switches.

Both of these switches are available now through authorized PMI dealers and distributors.

For more information, contact Peripheral Marketing Inc., 16-6 Passaic Ave., Fairfield, NJ 07006.

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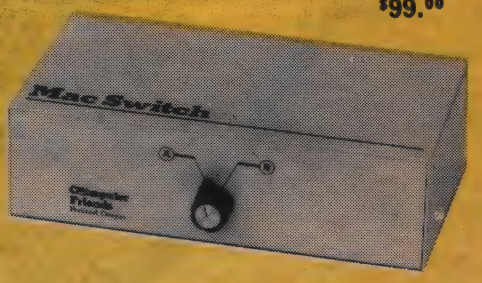

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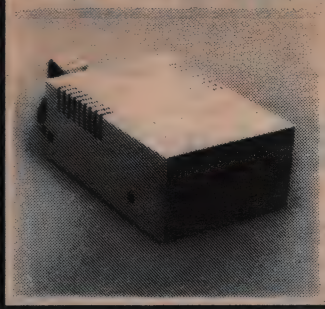

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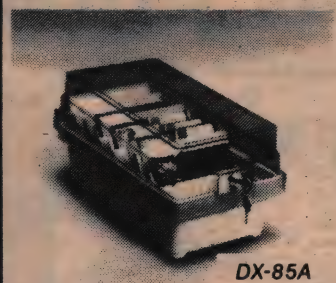

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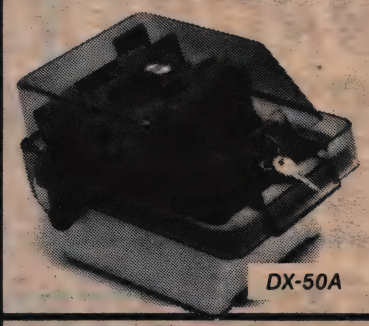

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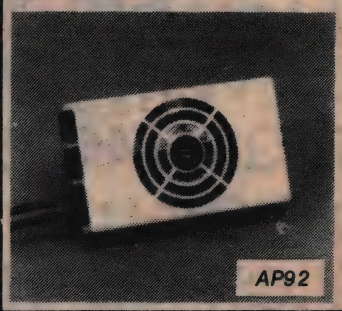

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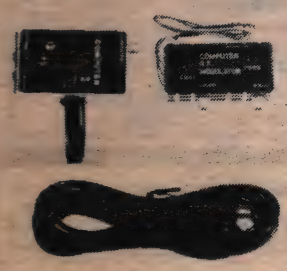

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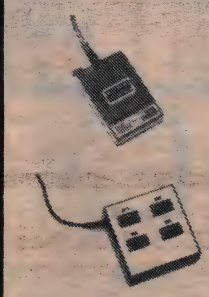

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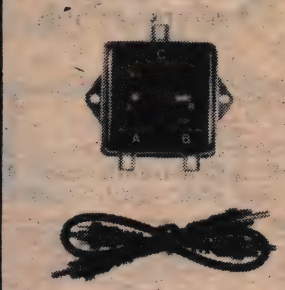

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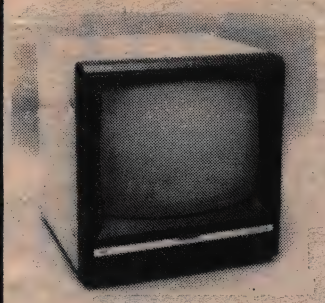

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New Gambling Series For PCs

Caesar's World Productions, Inc., and Screenplay, Inc., announce that they have signed a license agreement under which Screenplay will create a computer software series called "Caesar's Guide to Gaming."

The newly developed computer programs will be designed to help players improve their skills through the simulation of casino games as played at Caesar's Palace in Las Vegas, Nevada; Caesar's Tahoe at Stateline, Nevada; and Caesar's Atlantic City in New Jersey. Players will be able to use the appropriate casino house rules for such games as twenty-one ("Blackjack"), roulette, craps and baccarat. They also will have the capability to modify the rules to suit their own individual tastes.

The first program in the planned series, Blackjack, will cover the game of twenty-one and will retail for $69.95.

The series will be available for the IBM Personal Computer and compatibles, the Apple II series, the Apple Macintosh and Commodore computers.

In the initial Blackjack program, a player will be able to simulate playing at one or more seats at a casino table, set table limits and determine other variables in a typical game. The player also would be able to simulate a cast of players with their own personalized styles and strategies.

The computer program will include instructional drills which present various game scenarios. Incorrect moves made by the player will be stored in the computer memory for later redrilling in the player's areas of weakness.

The companies say they expect the "Caesar's Guide to Gaming" series to be sold in computer and software stores, bookstores and other retail outlets as well as by mass merchandisers.

For more information, contact Screenplay, Inc., 1095 Airport Road, Minden, Nevada 89423.

Mention that you read it in Computer Shopper. ●

LET THE CLASSIFIEDS WORK FOR YOU... WHILE YOU PLAY! ADVERTISE IN COMPUTER SHOPPER

WP "Sampler" Available From Samna

Samna Corporation has introduced a word processing "sampler" to let prospective purchasers test drive Samna personal computer software before they buy.

The $14.95 Samna Sampler includes a program diskette and a data diskette; a keyboard layout chart and command reference card; a keyboard template, and a 44-page instruction booklet.

Among the advanced features available in the Sampler are three levels of user help; line drawing and zoom; alternate keyboards, including Greek/math; simultaneous windowing of two files; horizontal scrolling to 250 columns, with fold; automatic section numbering, and floating footnotes.

The Sampler is designed to run under PC-DOS or MS-DOS 2.0 or higher on an IBM PC or PC-compatible processor with 256K bytes of memory. A graphics adapter is required for line drawing and zoom. Files created under the sampler program diskette can not be printed, or read by standard Samna program diskettes.

Samna III was reviewed in the December issue of Computer Shopper.

For additional information, contact Samna, 2700 N.E. Expressway, Suite C-700, Atlanta, Georgia 30345. ●

Citicorp Introduces Data Access Software For PC's

Citicorp Information Services has introduced two data access software products - Citiquote Investor and Citibase Connection - geared to the personal computer market.

Citiquote Investor™ is a microcomputer program that allows users to perform the basic tasks of portfolio evaluation and analysis. Information on some 61,000 stocks, bonds and options, verified and updated daily, is obtainable from Citiquote, Citicorp's securities database.

A key feature of Citiquote Investor is its ability to screen securities to meet a customized investment criterion. In addition, the program permits generation of pricing histories, position reports and dividend and interest performance histories. The downloaded data also is compatible with spreadsheet and utility software packages.

Time sharing charges are minimized by the program's ability to store downloaded information on the disc. And as many as 50 portfolios can be updated at one time.

The Citiquote Investor is available on a floppy disc for the IBM-PC or the PC-XT. 320K of memory is suggested; 128K is the minimum. The required disc drives are two-floppy or one-floppy and one hard. A Hayes Smartmodem™ is needed to access Citiquote™.

The Citibase Connection™ is another product geared to the personal computer market. It permits users to connect an IBM-PC or PC-XT to Citibase, Citicorp's U.S. economic data base.

Citibase contains some 5000 time series, most of which date to 1947. The database was established more than 15 years ago by the National Bureau of Economic Research. It moved to Citicorp in 1978.

The Citibase Connection automatically dials a local telephone number, signs on to Citibase and requests a preselected data, which it writes on a PC diskette. The program automatically and continually checks for accuracy of transmission.

Once downloaded, the data can be managed with major software packages such as LOTUS 1-2-3™, Multiplan™ and Visicalc™ or with economic software like SORITEC™, WORKBASE™ and ORACLE/MODLAR™.

For more information: Citicorp Information Services, Citibank, N.A., 399 Park Avenue, New York, NY 10043. ●

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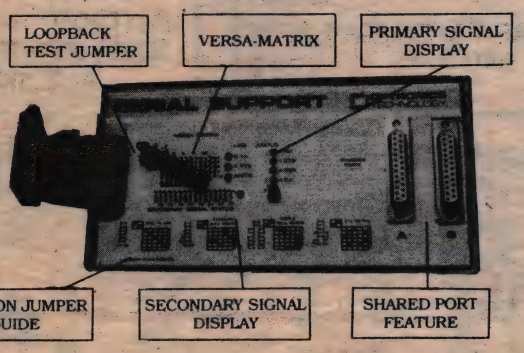

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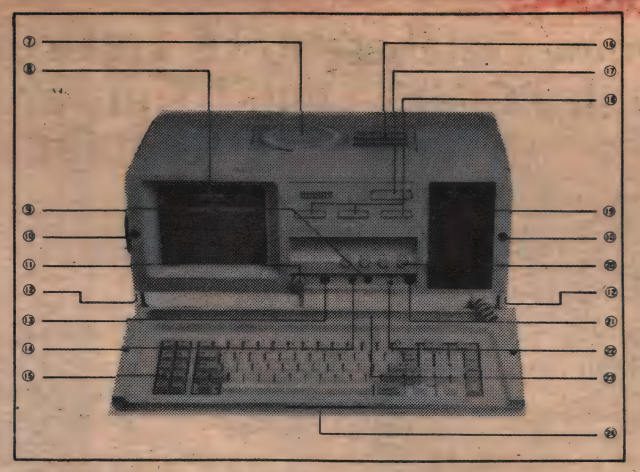

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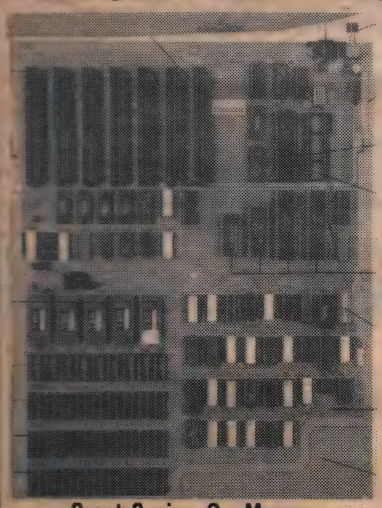

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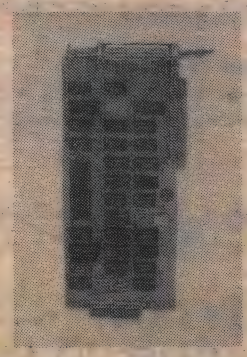

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Online Database Costs Reduced With PC/NET-LINK™ Software

A newly enhanced version of PC/NET-LINK, a menu-driven microcomputer software package for information retrieval from online database services, has been announced by Informatics General Corporation.

The software package automatically logs on and provides a menu-assisted approach to databases from most major online retrieval services including BRS, DIALOG, Dow Jones, LEXIS/NEXIS, MEDLARS, NewsNet, Questel, SDC, Westlaw, OCLC, RLIN and Net-Search.

Required hardware for the software package is an IBM PC/XT or PC with an external hard disk drive.

Enhancements allow the user to create and edit search formats offline and later upload them to the chosen database; and to download search results on hard disk.

Other PC/NET-LINK features include search/format storage and indexing by name and date.

PC/NET-LINK also allows the searcher to find information even if the desired database and its service are not known. The package contains a single integrated directory of databases from all of the services it accesses. Its two-level subject menus lead the searcher to the right group of databases for the search. The searcher then has two options: reviewing a list of databases within that group; or seeing a one-screen description of a specific database's contents and a list of the retrieval services through which it is available.

The enhanced package, as well as the earlier version, features a database index that includes detailed descriptions of 125 of the most frequently used databases. This index can also be added-to, enhanced and edited as needed. Informatics can also customize the database index to serve a particular customer's requirements.

The enhanced PC/NET-LINK is available now and is priced at $550 with quantity discounts offered; $400 is set price for library schools and Federal Government agencies. Required communications software is an additional $100.

More information on PC/NET-LINK is available from Informatics Library Services Division, 6011 Executive Boulevard, Rockville, MD 20852.

Mention that you read about it in Computer Shopper. ●

Mascope-T Linear/Integer Programming Software

MAS has introduced the first truly user-friendly package for solving real world linear and integer programming problems on a micro. The MASCOPE - T software is designed specifically for the busy executive who needs to solve complex business problems in plain English without the use of complicated procedures or mathematical jargon. Everything is menu driven and entered just like it would be written onto a sheet of paper. Problems can be entered, saved and recalled later without using any other software or editors.

The new MASCOPE - T software is so powerful and easy to use that it was ranked #1 against all competitors evaluated by Pepperdine University for teaching their students the concept and application of linear and integer programming. As part of the MASCOPE - T package a special tutoring disk is provided that explains linear and integer programming in a straight-forward manner targeted to the needs of the business and management student. The tutor disk is actually an interactive "textbook" that demonstrates linear and integer programming "in action" and shows how it can be used to help reach difficult day-to-day decisions.

The MASCOPE - T software provides all of the features of the larger MASCOPE packages but only a fraction of the cost. MASCOPE - T lists for $75 with a discount price of $48 for academic institutions. This makes it ideal as an affordable training device for each student. The MASCOPE - T package requires a minimum of 192K bytes of RAM and includes: the special tutoring disk; a MASCOPE disk for solving problems with up to 50 variables; and a hard bound users manual. Packages for solving larger problems are also available.

For more information: Management Analytic Support, Inc., 6826 Dean Drive, McLean, VA 22101. (202) 293-1624.

Mention that you read about it in the Computer Shopper.●

Greetingware PC Sing-Along Birthday Gift

Super GREETINGWARE, a new product from Roxbury Research Inc., is a perfect birthday gift for one's favorite IBM PC person. It includes a built-in musical greeting card with six multiple verse, sing-along birthday songs plus more than twenty hours of exciting brain teasing games which can be played by one to four people. Questions are structured in the AHA! tradition and players experience the joy of discovery in a lightly competitive atmosphere. Each player uses his own designated answer button and the program times each turn as well as the answering cycle. Background music is optional and is controlled by an on/off toggle (function key). Players are rewarded by correct answers and penalized for incorrect answers or taking too long to answer after pushing the answer button. Players' names and scores are continuously displayed on the game screen. Players can specify the amount of time per turn (5 secs. to 10 mins.) prior to playing any of the 25 games

Continued On Page 48

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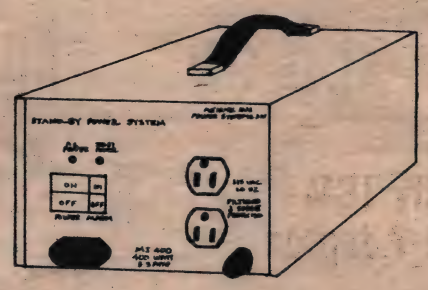

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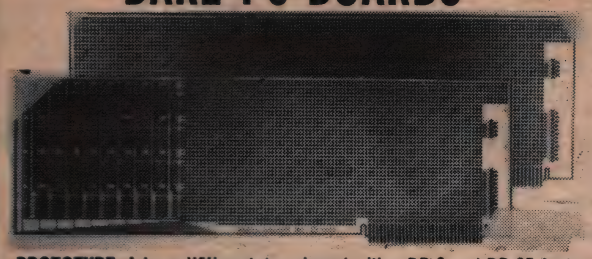

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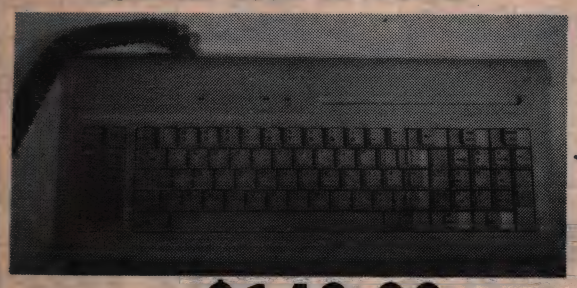

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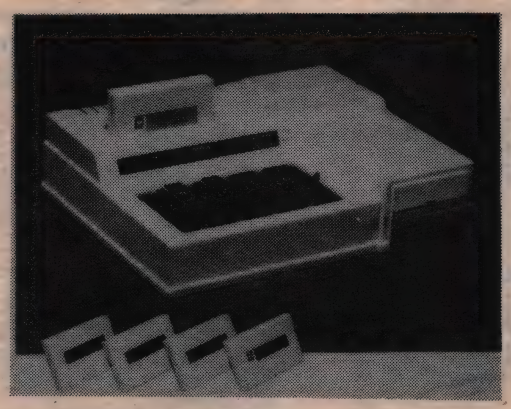

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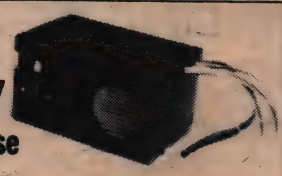

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Super Greetingware
Continued From Page 46

which are selected from a game menu.

Super-GREETINGWARE retails for $29.95 and is currently available by mail order. It will run on any IBM PCjr (with a disk slot), PC, XT or AT with 128k of memory, DOS 2.0 or newer (2.1 if PCjr), advanced BASIC and a color or monochrome display. For an additional $3, the customer can have Roxbury Research replace the standard birthday greeting ("Have a happy birthday and a wonderful year!") which is displayed on the message screen with his own personal message (up to 420 characters).

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Electronic Novels For Home Computer Users

Synapse Software, a leading developer of software and products for the home and personal computer markets, today announced the introduction of a series of "Electronic Novels" for home users of IBM PC, IBM-compatibles, Apple, Atari and Commodore computers.

"Electronic novels pick up where the printed work leaves off," said Jon Loveless, president and CEO of Synapse Software. "The Electronic Novel will provide the home computer user with a mind-stretching, interactive and imaginative form of entertainment, tantalizing enough to satisfy the taste of this increasingly sophisticated market."

Synapse's Electronic Novels are packaged in hardbound book form. The early chapters set the scenes, the story line, and introduce the characters and information relevant to the "journey" which the user completes on a personal computer, using the floppy disks which are included in the back of the book. A section of blank pages is included in each novel for map-drawing or notes.

"In the Electronic Novels," Loveless continued, "The user is in the center of the action, and the decisions he or she makes determine the outcome of the plot. The user's imagination is an active and creative part of the story."

Using a new interactive language developed by Synapse's programmers, the company's professional fiction writers and development staff have created products which enhance the experience of dialogue. This language gives the product a sensitivity which other entertainment programs lack. The manner in which the user "talks" to the characters will elicit a reply which is also "in character." For example, when the user in Mindwheel tells the "thug" charcter, "I have the Wheel," this is the reply: "I'd like to give you a serious knuckle massage with the Wheel of Wisdom!' snarls the thug." The user's response to this jibe will dictate the next adventure.

The first titles in the series of Electronic Novels are **Mindwheel**, a journey into the minds of four deceased people of extraordinary power, and **Essex**, the story of an intergalactic search and rescue mission. Additional novels are under way, including **Brimstone**, a medieval adventure story, **Breakers**, a science-fiction fantasy on the planet Borg, and **Ronin**, a samurai epic.

Mindwheel and **Essex**, will be available for delivery starting January 15th, 1985. **Brimstone, Ronin** and **Breakers** will be delivered later in the spring. The suggested retail price for each novel, to be sold in fine book and software stores, is $44.95 for IBM, IBM-compatible and Apple computers, and $39.95 for Atari and Commodore computers.

For more information contact Synapse Software, 5221 Central Avenue, Richmond, CA 94804.

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This package was originally developed on the Fortune 32:16 microcomputer in 1983 and is currently available on the AT&T 3B line and Zilog. Suggested list price is $350.

For additional information: National Marketing Manager, SST, Inc., 9434 North 107th Street, Milwaukee, WI 53224. (414) 355-6990. Telex 590597 (SSTINC).

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APPLE II

Universal File Conversion

A Review
by Philip Chien

One of the major advantages of the Apple // computers vs. other personal computers is the variety of different operating systems available. Four major operating systems have been released.

Apple DOS—Apple Disk Operating System (originally in 1978, but updated to its present structure in 1980)

UCSD P-system (Apple Pascal)—University of California at San Diego Pseudocode System primarily used with Pascal,

CP/M—Control Program for Microprocessors,

ProDOS—Professional Disk Operating System (originally released in a more sophisticated form for the Apple /// as SOS (Sophisticated Operating System) in 1980, but released for the Apple //s in 1984.

This also leads to one of the major complications of the Apple // computer. Although the encoding format (RWTS—Read Write Track Subroutines) is identical for all four operating systems (which explains why one copy program can copy diskettes created for any of the operating systems), the file structure is different. DOS allows up to 35 characters for a file name, CP/M-80 only allows 8 (plus three characters for a file extension), CP/M-80 requires a line feed after each carriage return in text files, Pascal requires a 2K header block for text files, ProDOS uses sub-directories, etc. Each operating system has its own advantages and disadvantages, but transferring files from one operating system to another has always been a pain. Various file transfer utilities come with operating systems, but they are incomplete, Microsoft's APDOS will only transfer from DOS to CP/M, but not from CP/M to DOS, separate programs are required to transfer from Apple Pascal to DOS and from DOS to Apple Pascal, etc. To transfer a file from ProDOS to CP/M the file would first have to be transferred from ProDOS to DOS, using the ProDOS CONVERT program, and then from DOS to CP/M using the APDOS program.

Universal File Conversion from Quality Software solves the problem of using four operating systems on one computer. UFC is a utility which transfers files back and forth between all four operating systems. It will operate on a 64K Apple //, and does not require external hardware (e.g. CP/M card, Apple ///) to operate. It will also format the destination diskette, although it will not put operating system files (DOS, CP/M, SYSTEM.APPLE, SYSTEM.PASCAL, PRODOS.SYS, BASIC.SYSTEM, etc.) on diskettes it formats.

UFC is menu driven and fairly easy to operate. Extra features include cataloging both source and destination diskettes, help screens, and drive location prompts. If you have created a text file using Applewriter (DOS or ProDOS), but the person who you are sending the file to only has WordStar (CP/M), you can easily make a diskette with the file in CP/M format.

UFC comes on a 5-¼" copyable (Thank you!) diskette. The 48-page manual is well written and includes a bibliography. Instead of just being a good utility, the program/documentation is also a good tutorial into how the various operating systems work. Twenty-five pages of the manual describe how each of the four systems stores its files. I would recommend the manual by itself as a tutorial for anybody who wants to know how any of the four systems works.

Although the documentation states that the program requires only one disk drive, I highly recommend at least two, and possibly even three, drives. The program will prompt you when to change diskettes, but even with a two drive system, you must change diskettes several times to load in the different driver modules needed. Fortunately, the program prompts you when to change diskettes.

Most importantly, UFC does a good job of converting files back and forth. The menus and prompts are easy to follow, and files are converted reliably. It takes 35 seconds to convert a 58 sector (about 11 double spaced pages) file, the same time it takes for ProDOS's CONVERT to convert the same file. For comparison, it takes 16 seconds for Applewriter //e in DOS to load that file, 12 seconds for Applewriter //e in ProDOS to load the file, and 5 seconds for the Pascal Editor to load it.

The program will not, however, convert Random Access Text files. Due to the variable nature of Random Text files, though, I highly doubt that anyone will ever be able to write a program to convert one without a lot of user input.

UFC is primarily designed for Text files, HIRES pictures, DATA files and other non-language dependent files. It will not convert an Applesoft BASIC program to work in Pascal, or even MBASIC in CP/M or Business BASIC on an Apple ///. It can't convert the tokenized BASIC data. To change a program from one BASIC into another, you must save the programs as a text file, transfer the program to the destination operating system using UFC, load it in, and edit out the differences in code (e.g. PR#, LPRINT, and all other BASIC commands which won't work properly in the destination operating system).

UFC is not perfect, however. It does not timestamp files correctly. All Pascal files will have the date 14-AUG—80, and ProDOS files will have the stamp "<NO DATE>." Diskettes formatted by the format function will be named "BLANK," you cannot select a name for a diskette you format.

The program will not overwrite an already existing file. Normally this is desirable (would you want to accidentally overwrite your payroll file?) but it can be a pain if you have several files with similar names. For example, if you

Continued on page 50

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Universal File
Continued from page 49

want to transfer from DOS to CP/M files named TEXT.FILE PART1, TEXT.FILE PART2, and TEXT.FILE PART3; they will all have the same name in CP/M (TEXTFILE.PAR). First you must rename the files from DOS, then run UFC and convert the files. It would be nice if there were a feature to give the file a new name.

Since the program is written in Pascal, you MUST have a floppy drive in slot 6. If you have a hard drive or other card in that slot, you must disassemble your system, swap cards, and reassemble to run UFC. If you have an Apple /// the program will not work (since the // emulator mode only has 48K available) unless you obtain the source code and modify the program to work with the Apple /// Pascal.

Since you have to swap diskettes several times while converting files, I highly recommend that you use backup copies, and write protect the UFC diskette and all source diskettes. It can be very easy to make a misteak (see?) and erase an important source diskette.

Quality Software has made the source files available for programmers who wish to modify UFC to work within other programs, work with disk drives other than Apple compatible drives, or for curiosity how UFC works. Good point for Quality. Source code (in this case Pascal 1.2 and Pascal Assembler files) are always interesting for a beginning programmer, and useful for an experienced programmer. Quality charges $10 extra for the source code. Bad point. In my opinion, for a utility like this, the source code should be provided on the diskette, and license agreements should be available for a software developer who desires to include portions of the code in another program.

Overall, UFC is an excellent utility (especially for a first release), I've used it for a variety of files, and I highly recommend it to any user who needs to transfer files between the different operating systems. However. . .

I look forward to future enhancements also.

Program: Universal File Conversion
Purpose: Utility to transfer files between different Apple operating systems.
Market: Anybody who uses programs in more than one Apple operating system.
Hardware Requirements: 64K Apple, at least one Apple drive in slot 6.
Retail Price: $34.95
Author: Gary Charpentier
Distributor: Quality Software, 21601 Marilla St. Chatsworth, CA 91311.
Summary: Excellent file conversion utility

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One of the biggest annoyances in the Apple][is the use of 16-pin IC socket for the game I/O. Most of the time it works fine. You plug your joystick into the game I/O and leave it alone. Unfortunately, when you use an accessory which you plug and unplug often (e.g. switching between a Computereyes video input board and a joystick), the pins on the IC plugs have a tendency to fall off if you bend them accidentally when plugging the connector into the Apple's motherboard socket. The Apple //e corrects this problem by using a DB-9 connector on the backplane of the Apple's case, but since the DB-9 connector does not contain all of the signals needed, there are still many products which must be plugged into the motherboard's game I/O socket. You can obtain a Zero force socket, but a ZIF Socket is expensive, and soldering it to the motherboard voids plenty of warranties. There are commercial devices which extend the game I/O socket outside of the Apple which include ZIF sockets, but they cost $$$. Fortunately, there's a much simpler method. Buy a 16-pin wire wrap socket. This is an IC socket with much longer than usual legs which are normally used with, as you'd expect, wire

Continued on page 51

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Kids At Work

A Review
by Tom Larson and
Carol Novillis Larson

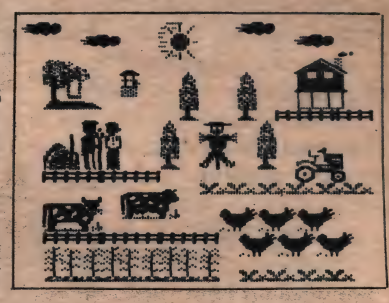
The name *Scholastic* brings to our minds recollections of school days now long past, when reading *Junior Scholastic* and *Scholastic* magazines often constituted one of the few times of interest in the otherwise dull days of drill and practice. In preparing this review of the program Kids at Work, we found universally positive connotations associated with the name *Scholastic* among the educators we talked to. We assume that such connotations are widespread and may well be a major factor in a parent's decision to purchase programs for their children. While we cannot comment on the entire inventory, we think that a careful look at this particular program may be of interest to parents of young children.

The version of Kids at Work we review here is for the Apple II+, IIe, and IIc computers. Versions for the IBM PC and PCjr, as well as for the Commodore 64 will be coming soon. The basic idea or premise of Kids at Work is that the child is able to construct city scenes or country scenes on the Apple screen by manipulating either a construction worker or a farm girl. These screen characters carry pre-defined hi-res shapes from one of the Shape Rooms to the Main Picture Room. There are 34 city shapes such as buildings, cars, streets, and even King Kong himself. Some of the buildings are designed in such a way that they can be combined to form large skyscrapers. There are 35 country shapes such as cows, barns, fences, and a wishing well. A given picture may contain up to one hundred total shapes. Each individual shape can be used as many times as the child wants, as long as the total limit is not exceeded. City shapes and country shapes cannot be combined in a single picture. We think that this limitation lessens the creativity possibilities that the program intends to foster.

The movement of the construction worker and the farm girl is controlled by the I-J-K-M keys on the Apple II+, IIe, and IIc. The information sheet for this program indicates that joysticks are supported; however, we could not get the program to recognize joystick input, and indeed, there is no mention of joysticks in the documentation itself. Joysticks certainly *should* be supported, since the program's main focus is the movement of objects from one room to another, much in the tradition of the Pinball Construction Set. Given the age group that this program is aimed at, joysticks would have been more appropriate than keyboard keys as a means of moving the on-screen characters. We ourselves found that it was difficult at first to get the hang of moving and picking up objects. Even when we got used to the program, the set-up remained awkward at best. The main problem is that the large size of the characters impedes precise placement of the shapes. Our ten-year-old consultant, Ann, also expressed frustration with this aspect of the program. In defense of *Scholastic*, we think that the characters are as big as they are so that they will get the attention of very small children.

The city shapes and country shapes are both large enough and vivid enough to attract the attention of small children if you have a color monitor. We mention this because we feel that very small children (say 5- or 6-year olds) will lose interest fast if a monochrome monitor is used.

The program provides for the drawing of novel shapes in the Make a Shape room. This feature allows the child either



to alter a pre-defined shape, or to create his or her own new shape. In essence, this feature

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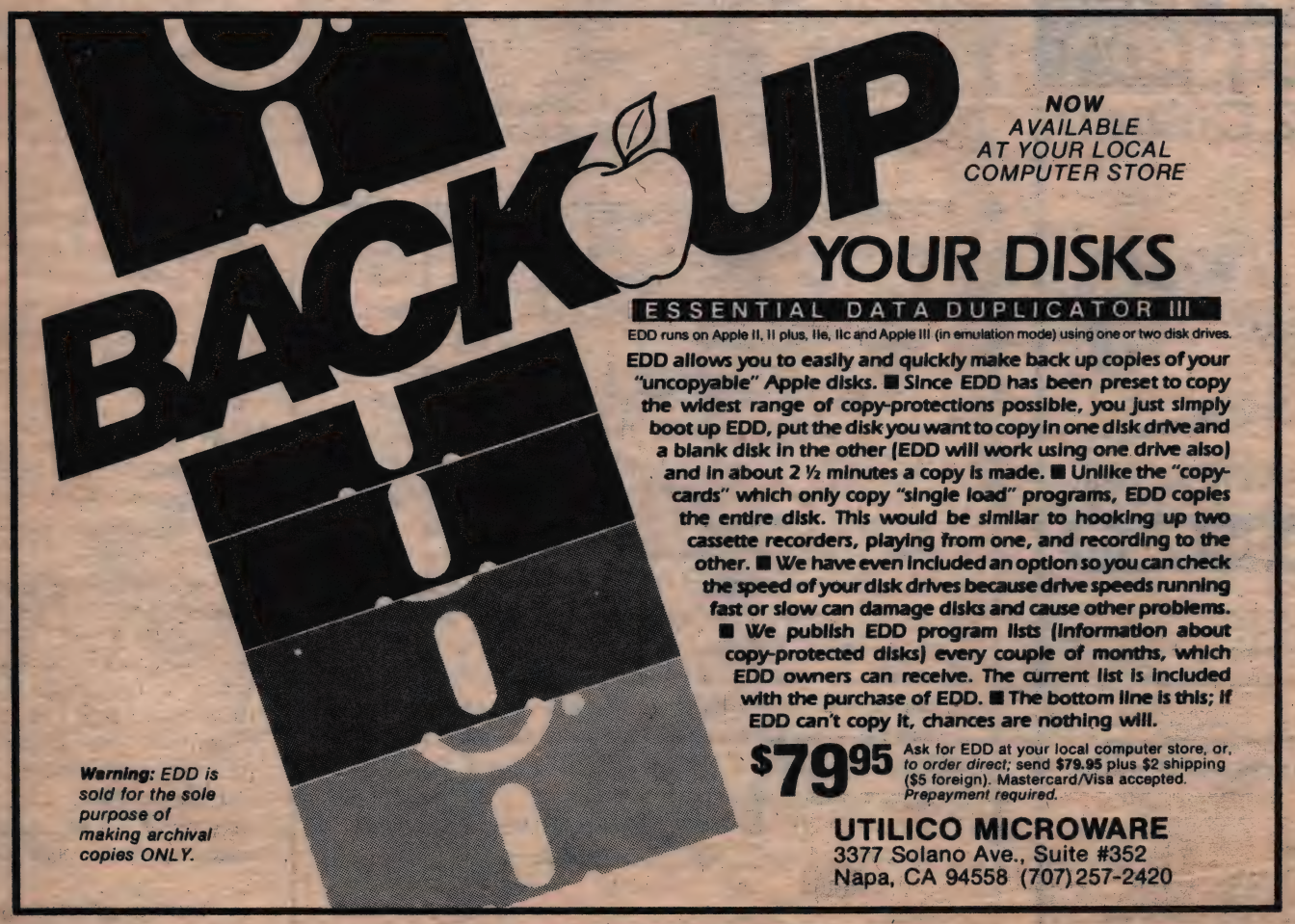
Universal File
Continued from page 50

wrap tools. Radio Shack sells them for $1.39 for two (part number 276-1994). Plug your joystick (or other doohickie) into the wire wrap socket; and plug the combination into the motherboard's game I/O socket. Leave the joystick and wire wrap socket attached together. When removing and inserting the joystick, remove both the joystick and socket together. Keep your joystick attached to the wire wrap socket always. The wire wrap pins are much sturdier than the pins on the joystick, and even if they do break, better to replace a 70¢ wire wrap socket than a $50 joystick, or wait umpteen days (weeks?) for the joystick to be repaired.

You may wish to mark the front of the socket to help you determine if you're plugging in the connector backwards. I find that a dab of liquid paper does the job fine. Should you ever need to ship your joystick to another person, or put it into storage, I'd leave the wire wrap socket on to protect the pins. Many times I've had foam blocks fall off joysticks, and pins broken. Since I've been using wire wrap sockets to protect the pins, I've never broken any pins. Whenever a new product comes in which uses the game I/O, I always attach it to a wire wrap socket.

As an added bonus, should you need to check out any signals, micro test clips will easily clip onto the wire wrap pins; and if you need to wire devices in tandem (e.g. a joystick and a shift key mod) then you can wire wrap the device to the socket without having to solder anything to the motherboard. ●



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Kids At Work
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acts like a font-editor. Its major drawback is that there is not much room given for the creation of the shape—on the average a 2x2 inch square. And this area is a magnification of the final shape size—which is about a square inch. The editing features are clumsy, using the regular movement keys, plus H-U-O-"," for diagonal drawing. This feature of designing shapes is somewhat difficult to use and seems to be downplayed in the documentation. Yet, it is perhaps the aspect of the program that, if implemented correctly, has the most possibilities for creativity. We wish *Scholastic* had done a better job with this part of the program. The graphics editor in Print Shop, for example, offers a much larger screen area for drawing (about 5 inches by 5 inches); we think this is important for young children.

The pictures created by the child can be saved to a data disk. The program itself provides a means of initializing a disk; however, any normal DOS initialized disk seems to work. Pictures can also be sent to a printer, but with several limitations. In order to use the printer option, you must have one of the following three printer cards: Grappler, Pkaso (other than the earliest versions), and Silentype. A sticker on the cover of the program package says only "printer optional"; you must open the package (presumably only after you buy it) to discover that Kids at Work works only with this limited range of printer cards. We feel that this kind of limitation should be clearly stated on the outside of the software package.

Assuming that you have the right kind of printer card, you will discover that the picture printed is the standard hi-res Page 1, and as such, it is really too small to be of interest, especially to a young child. (See Figure 1 for a sample picture that Ann drew for us). We wonder why the program requires a particular printer card, and then, at least in the case of the Grappler, does not utilize the card's ability to alter the printed image. Moreover, the saved Kids At Work pictures are not ordinary, complete, machine-language hi-res pictures, and hence are apparently not intended to be loaded into memory outside the control of the program.

There is a way to get at these pictures, however—we offer the following suggestion for parents' consideration. Once the picture has been created and saved via Kids at Work, you can return to the Main Picture Room. Then, position the worker where he or she fits in best (you can't get it completely off the screen, but the lower right hand corner will allow you to remove most of it). Next, be sure a simple DOS-initialized disk is in drive one and hit the Reset (or Control Reset, or Control Open Apple Rest, depending on your machine). A message on the screen will then allow you to hit RETURN to reboot the program. If you have an initialized disk in drive 1 when you hit return, you will get a cursor on the screen. If you then type "BSAVE picture name, A$2000,L$2000" the complete picture will be saved to the disk. You then can use your printer card and/or a graphics program such as Printographer, Fontrix, or The Complete Graphics System II to manipulate the picture. We have found that printing the picture double-sized makes it big enough for young children to appreciate; they can then make further use of the picture by, for example, coloring it.

To return to the program itself, we must assess its worth aside from the technical considerations mentioned above. The assessment must consider both the educational claims made by the manufacturer and the interest to kids themselves. The Product Catalog, included with the program, indicates in a comparison chart that Kids at Work provides learning opportunities in the following categories: 1) creativity and 2) reading and writing. It suggests that the age group the program is aimed at is over five.

We must warn prospective buyers that, in our estimation, this program has absolutely nothing to do with reading and writing skills. It will not directly help your children develop these skills. The manual is too difficult for children under eight or nine years old to read. In fact, the manual can be somewhat confusing in places for adults, since in addition to the Apple it covers operations with both the IBM PC and the Commodore. With respect to the program itself, the screen messages for Kids at Work are too difficult for the young children to read. The opening message is as follows: "Welcome to Kids at Work! To save your pictures, you need an initialized data disk. If you do not have one, choose Computer Stuff from the Kids at Work Menu and follow the instructions." If the child manages to get through this message, he or she will be on the brink of potential disaster: the initialization process erases disks. Fortunately, if the child does get to the point of initializing a disk, the program recognizes the Kids at Work disk and will not allow it to be written over. Now certainly, an adult will be walking the child through the program the first couple of times, but what about after that? And the messages don't get any better. For example, here's another one: "Build a city or country scene with your imagination and your friends, the farm and construction workers."

Once the child gets to the main part of the program, that is, constructing picture-scenes, there is simply no reading involved whatsoever, except for the Make a Shape room, where the messages remain too difficult for the child to read: "Color is WHITE; Cursor is MOVING; Type ? for help." We don't mean to imply by these remarks that no young child can read these messages, or that a ten-year old couldn't read them; rather, we want to point out that there is no *activity integrated with the program design itself* which is meant to increase reading or writing skills. In addition, the screen messages will in our opinion provide a definite problem for the younger child—to whom the basic program is most likely to appeal. Other educational programs include simple icons to aid in menu selection. Given that many new programs for adults make use of icons, we see no reason not to include such a feature in a young children's program.

As for creativity, this is a much harder area to address. The program does have some value for young children in terms of spatial visualization and eye-hand coordination. And, to its credit, there are few if any rules about the pictures you can create. The documentation, in fact, urges the child to consider that "anything is possible," including "a pig jumping over a barn" and "a hot-air balloon carrying a skyscraper." The child is thus encouraged to experiment, and

Continued on page 53

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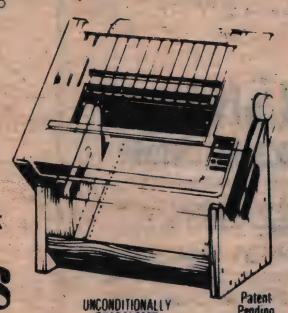

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Kids At Work
Continued from page 52

we feel that this is good. The fact that he or she can create new shapes is also a positive feature; although, as we noted earlier, this feature is somewhat limited in its use, and would be difficult for very young children to utilize.

It is almost certain that an adult will have to go through the program with the young child the first couple of times, and will probably always have to assist in the saving and printing of pictures. This, in itself, is not a negative fact. Indeed, we know, for example, that children learn more from television when it is watched and discussed with a concerned adult. Despite the interactive nature of the computer, this is probably also true to some extent in this area too. However, given the investment of time required, we think that a wiser choice of software would be something that had more in-depth appeal, something that the child is not as likely to tire of as fast as we think they will tire of Kids at Work. We are quite certain that eight through ten-year olds will become bored with the program in short order. Ann was initially intrigued with the program, but after a week was losing interest. It did lead her to explore non-educational graphics programs like Print Shop and Fontrix, and she is now thinking about giving Logo a try. As far as the five and six-year olds go, Kids at Work may have a longer life span. Still, the program lacks the creative punch of programs like Face Maker and the Sticky Bear series; it also lacks the room for growth that a program like Delta Draw has. On the other hand, the concreteness of the pre-defined images may appeal to small children to a greater extent than the abstract drawing capability of Delta Draw.

Kids at Work has a list price of $24.95, and it is copy protected. For the first 60 days, *Scholastic* will replace defective disks free; for the next ten months, they will replace a defective disk on a one-time basis for $10. The program is well packaged and the documentation is nicely printed and complete. It is not, unfortunately, aimed at the child himself. And, although the price is reasonably low, we think that there are other options available to parents which return more for the money spent, both in terms of program interest and in terms of educational value. ●

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Assembly Language Programming

For The Apple II

This article is excerpted from Assembly Cookbook For The Apple II/IIe ($12.95), published by Howard W. Sams & Co., Inc.

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PROLOG—
The first part of a source code listing, used mostly to inform the programmer or user.

BODY—
The second part of a source code listing, used mostly to hold assembler commands.

You will find a few pseudo-ops in the prolog, and there's bound to be lots of documentation in the body, but the prolog is basically for the user, and the body is basically intended for the assembler program. ●

Startstuff

The *startstuff* is a few lines of code always used at the beginning of your program to get everything off on the right foot.

Let's look at some typical startstuff source code. Here is what you might punch into EDASM. . .

```
1  SBTL
2  SKP2
3  ORG $0800 ; PUT MODULE AT $0800
4  SKP2
```

You punch in your commands, using "space" to mean "tab" on "old" EDASM, or real IIe tabs on "new" EDASM. The line numbers are provided free for you. So, when you see that "1," you hit a space or tab to get past the label field, because you do not want a label on line 1. The SBTL is the pseudo-op here, and tells the assembler to name and number each assembler listing page. The first SKP 2 tells us to put some white space between the header and the first printed line. SBTL, of course, will not print, and we will see its *result* instead.

On line 3, you tell the assembler that you want this code to be assembled onto disk such that the object code will eventually load into and run starting at location $0800. The space and the semicolon are needed to ensure you are really in the comment field. The space after the semicolon is actually a space, but it is an unneeded one I throw in to make things prettier. The comment field here is intended to inform the reader or user where the code is going to run.

I prefer to put the ORG for origin command on line 3. This way, you always know where it is and are always forced to think about where you want your code to go before you write it.

The SKP 2 of line 4 is used to get some white space after the startstuff and the upcoming title block.

So, that is all there is to punching code into your assembler. You must be very careful to use spaces or tabs for tabs and must never have any spaces inside a label, op code, or operand column.

But, if you list or examine your EDASM code, you'll get everything tabbed over to where it belongs, more or less. . .

There are no labels in our startstuff so the label field stays blank.

When you get around to actually assembling the program, though, none of this will appear in your object code. Why? Because there are no "real" op codes so far. Just pseudo-ops. All our startstuff has done is tell the assembler to give us headers and page numbers on the listing, to start assembling into a certain location, and to leave some white space in two places.

Your assembler listing will look something like this. . .

And this one looks more different still. What happened to lines 1, 2, and 4? Why all those 0800s?

```
1          SBTL
2          SKP2
3          ORG  $0800      ; PUT MODULE AT $0800
4          SKP2
```

```
ZORCH.SOURCE                                    20-MAY-83 DEL #07 PAGE 1

----- NEXT OBJECT FILE NAME IS ZORCH
0800:              3          ORG  $0800      ; PUT MODULE AT $0800

0800:              5 ;  ************************************
0800:              6 ;  *                                  *
```

Well, we've taken a peek ahead here to show you how source code looks when first entered, when listed on-screen as source code, and when printed as an assembler listing.

Instead of line 1, we get the header and the page number. Instead of lines 2 and 4, we get the results of those lines with two skipped lines worth of

Continued On Page 55

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Assembly Language

Continued from page 54

white space. And, since we have yet to feed a "real" op code to our assembler, it stays "stuck" at $0800 and has nothing to put in all that white space reserved for object code bytes. Line 5 and 6 we borrowed from the upcoming title block, just to show you what it would look like. Should you end your assembly at this point, you will get an object code that is zero bytes long.

As we'll find out later, up to three object code bytes can follow the current assembly address, and a label can fit between the line number and the operand.

Anyway, back to our structure and the startstuff.

With EDASM, I like to start with the SBTLE command, because this gives you a nice header, date, and page numbering on each page.

There is one bug with SBTL, though. . .

Which simply says to call your own page breaks on a "new" or "old" EDASM assembly listing. Calling your own page breaks is a good idea anyhow for best legibility. Use the PAGE pseudo-op to do this.

> **The EDASM pseudo-op "SBTL" has a bug that causes certain printers to tab off-page if "old" EDASM itself produces a formfeed.**
>
> **One way to beat this is to always force your own next page with a PAGE pseudo-op.**

Anyway, so much for SBTL. Your own assembler may need different setup commands. If so, change the startstuff to suit your needs.

The next part of the startstuff is the origin line.

> **ORIGIN—**
> **That place in memory where the object code is to actually begin.**

Things get sticky fast here. On a disk-based assembler, you can give an origin command that goes anywhere in memory, even overwriting the assembler code. You can do this since the code gets put onto disk, rather than assembled directly into your machine. To get the object code into your machine, you load or boot the disk in the usual way.

Some in-place assemblers give you the option of assembling your code in one part of the machine with the intention that it eventually is to run elsewhere. This keeps you from overwriting the assembler during the assembly process. A block move of some sort is needed to relocate the object code in its final running position. These in-place assemblers will ask you for a *destination* address along with a final *object code* address instead. "New" EDASM offers this as an option.

Unless you go to a lot of trouble to make your object code relocatable, it will run only at one location in the machine. In fact. . .

> **EDASM demands an origin for the object code, or it will not give you any assembly at all.**

Continued on Page 57

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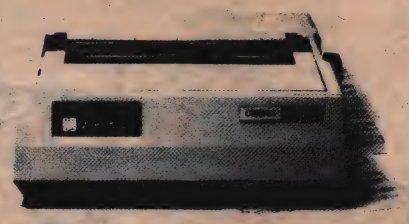

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Assembly Language
Continued From Page 55

Many dino assemblers will bury the ORG command in the middle of the source code somewhere. I like to always put it on line 3. That way, you always know where it is, which makes for easy finding and easier changes. You also get the "-----NEXT OBJECT FILE NAME IS ZORCH" line which keys the name of your source code to the name of your object code.

As a reminder, object and source codes must have different names, since one is a series of script-like instructions and the other is ready-to-run code. If you do nothing to EDASM, a source code called ZORCH will assemble into an object code called ZORCH.-OBJ0. I much prefer to tell the assembler to assemble ZORCH.SOURCE into ZORCH. More on this when we get to actually assembling programs.

You can also assemble your source code in several pieces. While you normally should try to put the whole object code together into one single piece, split object codes can have special uses on larger and longer programs.

If you are using more than one piece for your object code, a new ORG statement is needed for each piece.

EDASM does this one of two ways. If you absolutely define a new origin, you get a new object code file, usually named ZORCH.OBJ1, then ZORCH-.OBJ2, and so on. An example of an *absolutely* defined origin is ORG $8A00.

On the other hand, if you *relatively* define a new origin, EDASM generates only a single object file, filling in with garbage between the old and new object code. One way to define a new relative origin is to put some label, say START on your first line that holds a "real" op code. Then a source code command of ORG START + -$0300 will automatically add garbage at the end of the original object code, and start the new stuff off exactly at the origin plus $0300.

You could also back up, but this would overwrite generated object code and would normally be kind of dumb.

EDASM lets you generate more than one object code from a single source code, or else lets you move around and leave "holes" in one long object code file.

A *relative* new origin, such as ORG START+$0300 generates one long object code file with holes in it.

An *absolute* new origin, such as ORG $7600 generates a second and separate object code file.

At any rate. . .

Normally, you use a single object code without any holes in it. Multiple or continuous object code should be reserved for special uses only.

At any rate, your first origin

Continued On Page 58

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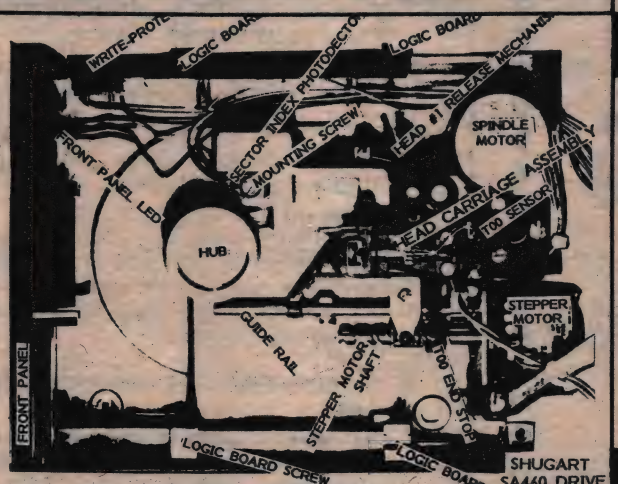

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Assembly Language

Continued From Page 57

pseudo-op in your program must be an absolute one, and must be done before any source code lines involving real op codes appear in your source code. This first ORG must exist, or EDASM won't generate any object code at all.

Once again, the purpose of the startstuff is to decide where the object code is to be assembled, to set up headers and page numbers, to give us some pretty white space, and to do anything else you need to get your assembler started off in the right direction.

Title Block

The next "piece" to the structure of an assembly program is the title block. The title block should name the program, give a hint of what it does, show the date and version number, and should include a copyright notice.

Here's an example of a title block. . .

The fancy box makes a good and attention-getting way of setting the title essentials away from the rest of the source code. Since most programs have funky or catchy names, you might qualify the name with a second descriptive line as shown here.

```
5  ;  ****************************************
6  ;  *                                      *
7  ;  *      -< IMPRINT MODULE >-            *
8  ;  *   (IMBEDDED STRING PRINTER)          *
9  ;  *                                      *
10 ;  *   VERSION 1.0   ($6500-$66A1)        *
11 ;  *                                      *
12 ;  *         6-15-83                      *
13 ;  *......................................*
14 ;  *                                      *
15 ;  *      COPYRIGHT C 1982 BY             *
16 ;  *                                      *
17 ;  *   DON LANCASTER AND SYNERGETICS       *
18 ;  *   BOX 1300, THATCHER AZ., 85552      *
19 ;  *                                      *
20 ;  *   ALL COMMERCIAL RIGHTS RESERVED     *
21 ;  *                                      *
22 ;  ****************************************
23  SKP4
```

You also should provide a version number, a version date, and the place in memory where the object code is going to run. Don't forget that object code can go a few bytes beyond the last assembled line number if that happens to be a 2- or 3-byte instruction or if there is a stash or a file at the end. If you don't know the length of your program ahead of time, take a guess, and correct it later.

The bottom half of your title block should have a copyright notice, your name and address, and a use disclaimer.

By the way, all software printed listings are protected automatically and free by an upgrade of what once was "common law" copyright until such time as they are sold. Theoretically, there are legal remedies to people ripping off your work. But. . .

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This is reality. All else is bull---.

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So, be sure to put that copyright notice on your listing. At the very least, it might keep you from being attacked by a leopard or hit by a meteor.

Maybe even both.

Usually, it is far easier to edit an existing source code than it

Continued On Page 59

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Assembly Language Continued From Page 58

is to create a new one. So, typically you will steal a title block off something you already have done and edit it into something new.

The title box, of course, is all comment. Remember that you start an all comment line with either a ";" or an "*". I prefer the ";" since it isn't as obnoxious and is somehow less dino looking.

What Does It Do?

Next, add as many comment lines as you need to tell us exactly what the program does. Keep this description simple, explicit, and mainstream.

Here's an example. . .

```
25 ;              *** WHAT IT DOES ***
26  SKP1
27 ;    THIS MODULE OUTPUTS TEXT STRINGS OR DOS COMMANDS
28 ;    TO THE APPLE II'S OUTPUT HOOKS, USING STRINGS
29 ;    THAT ARE DIRECTLY IMBEDDED IN THE SOURCE CODE.
30 ;
31 ;
32 ;
33  SKP4
```

```
34 ;              *** HOW TO USE IT ***
35  SKP1
36 ;    YOUR CALLING CODE SHOULD HAVE A JSR TO IMPRINT.
37 ;    THIS JSR SHOULD BE IMMEDIATELY FOLLOWED BY AN
38 ;    ASCII STRING ENDING WITH AN $00 MARKER.
39 ;
40 ;
41 ;
42  PAGE
43  SKP4
```

This description should apply to the main aim of the entire source code. Later on you will have lots of chances to show what the separate parts of the code do individually. I like to provide for six lines here. That's what the final three "empty" comment lines are for. The first SKP gives you some white space between title and description. The second separates this part from the next part of our structure, which tells us. . .

How To Use It

Next, tell us exactly how to use the object code. Tell us everything you need to know to use the main part of the code in the usual way you want it used. Again, hold off on specific details on special use modes. Tell us only the mainstream stuff as compactly as possible.

Something like this. . .

As with the title block and the "what-it-does" module of our structure, this block is pure comment, intended for people and ignored by the assembler program. Tell us here *only* the essentials of how to use the code that follows.

The PAGE command is used on line 42 because you most likely have put all you want to on the first page of your assembler listing. By the way, the notation we have shown you previously is the actual source code as you place it on screen. The assembler listing will have white spaces for the SKPs, page breaks for PAGE, and generated object code for "real" op codes.

There are three more "pure comment" modules. . .

Gotchas

A *gotcha* is anything that will make the program hang up or not work. Tell us here how much RAM you need in the Apple. Can a language card be used? Must a language card be used? Do you need Applesoft ROMs? Will it only run on a IIe? Does Eurapple timing make a difference? Is lower case necessary? Is a Flugelhoph card in slot 5 allowable? Are other code modules needed to let this program work? Will the program bomb if the paddles aren't plugged in? Are hardware modes required?

Here's an example of some gotchas. . .

```
44 ;              *** GOTCHAS ***
45  SKP1
46 ;    THIS METHOD IS BEST USED FOR SHORT AND UNRELATED
47 ;    MESSAGES INTERNAL TO YOUR PROGRAM.
48 ;
49 ;    MESSAGES CAN BE ANY LENGTH, BUT MORE THAN FORTY
50 ;    CHARACTERS WILL NOT PRINT CLEANLY ON YOUR
51 ;    ASSEMBLY LISTING.
52  SKP4
```

```
53 ;              *** ENHANCEMENTS ***
54  SKP1
55 ;    DOS COMMANDS ARE OUTPUT BY STARTING THE STRING
56 ;    WITH A CARRIAGE RETURN AND <CTRL>D.
57 ;
58 ;    TO GO DIRECTLY TO THE SCREEN, USE COUT1 RATHER
59 ;    THAN COUT.  THIS IS FASTER BUT YOU CANNOT USE
60 ;    DOS OR HARD COPY WHEN YOU DO THIS.
61  SKP4
```

It pays to keep the fancy title and stars on each and every one of the comment modules. This adds an overall consistency and style to all your programs, and forces you to put what is essential into the proper place.

Note also how a comment that is too long for one line can be broken up and done in several sequential lines. But remember that this is a *line-oriented* assembler. There is no way that anything "left over" at the end of one line will automatically get picked up and used on the next line down.

Enhancements

An enhancement is the opposite of a gotcha. What new can you do with the program that is above and beyond what you intended? How are these features activated? Why would you want to use them?

Again, here's an example. . .

Try to keep things that just about any user needs in the "what-it-does" and "how-to-use-it" modules. Save this module for details for the dedicated user who wants to go beyond what is obviously offered. Again, there will be room below for comments specific to smaller portions of the whole program.

Always keep your comments simple, straightforward, and to the point. Provide only what is needed, but *everything* that is needed. Do so as concisely as possible.

Continued On Page 60

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Assembly Language
Continued From Page 59

And, if you need to say more, add some. . .

Random Comments

If there is some other stuff you want to say about your whole program, here is what you cram it in. Again, we have a module that is pure comment. . .

We'll note in passing that

```
62 ;              *** RANDOM COMMENTS ***
63 SKP1
64 ;    TO RUN THE DEMO, USE $7400G OR CALL 29696.
65 ;
66 ;
67 ;
68 ;
69 ;
70  PAGE
71  SKP5
```

this particular demo is just a demo, and something that will not be used after you have studied it. Thus, this goes as a random comment, rather than in the "how-to-use-it" block.

So far, just about every line has been spent telling the user about something. Only our origin in the startstuff is something needed by the assembler program. Everything else is comments by one person for other people.

And that pretty much wraps up the prolog half of our source code structure. The prolog gets things started, tells us what the program is, and then tells us how to use it. The body is more concerned with getting input that the assembler can use, although it will also have lots of comments present.

Let's now pick up our first body module that both the assembler program and people can use. . .

Hooks

The hooks are "connections" that you want to make to known locations in the Apple II. . .

HOOKS—
Labeled connections made to known and fixed Apple memory locations.

As review, one of the big advantages of a symbolic assembler is that you can put labels on things. These labels can refer to values, to locations in a program, or to specific fixed locations in the Apple II or IIe. A hook is how you predefine a specific location for use by the program.

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MACINTOSH

MacUniverse

by L.J. Kutten

Welcome to MacUniverse, Computer Shopper's newest column. This column is dedicated to Apple's Macintosh computer and its world. Every month what is significant (and sometimes insignificant) and new in the Macintosh universe will be examined. Books, hardware, software, peripherals, and gadgets of all types will be covered.

The master of this universe is L.J. Kutten. In real life, he is a lawyer and writer specializing in computer and software law. He has been involved with microcomputers as a consumer for more than seven years. He is heavily consumer-oriented and interested in what the computer can do to make his world simpler. He can be contacted either through the Computer Shopper or CompuServe's Email.

This column will be free flowing. There are no set topics or editorial calendar. If you want something covered or have praise or a complaint about a particular product, let your universe master know. He is here to serve you. Now, let's get on with the show.

Did you know the name "Macintosh" was not originally planned to be the Mac's name. According to my reliable sources, Macintosh was the internal code name selected by two Apple computer engineers. They liked the name because it had something to do with apples (the fruit). The name took hold inside the company and somebody with loose lips let it slip out to the press. The press used the name Macintosh and ultimately Apple felt compelled by business reasons to stick with the name. Unfortunately there was one major problem. There already exists a company, McIntosh Electronics, that makes high quality stereo equipment. Apple had to get a license from McIntosh to use the name "Macintosh." Think of what we would be calling the machine if McIntosh Electronics had refused.

Is the great dearth of software over yet for the Macintosh? Well, if you can go by what your universe master saw last November at COMDEX, the world's largest computer trade show, the answer is NO! Every time yours truly saw something interesting and asked if it was being shipped, the answer was "We will start shipping in two weeks." (Now where have I heard that one before!) When and if the software actually does get shipped, I will review it and "tell it like it really is." If I think that a program is worth its weight in gold, I will tell you so. If I believe that the software is the worst piece of junk since the creation of the computer, I will also tell you.

For those of you waiting for a truly business program, hold your breath for Lotus' JAZZ. This program was demonstrated at COMDEX (unfortunately no hands on demos were allowed). Its capabilities are between Lotus 1-2-3- and Symphony. It has an integrated word processor, spreadsheet, database manager, business graphics generator, and telecommunications. JAZZ supports windowing (you can have two documents open at the same time!) and appears to be very user-friendly. Look for it in your neighborhood computer store after March 31, 1985 at a suggested price of $595. The only negative thing about it is that Lotus only plans to support the Apple modems (hopefully this will change). I predict this program will finally bring the Mac into the office environment.

If you have been waiting for a full featured word processor, like WordStar, your wait is almost over. Microsoft WORD for the Macintosh is being shipped. It retails for $195. WORD can work with 128K single drive Mac, but an external disk drive is recommended. Also, if you have the 512K Mac upgrade the program will work faster. While I could only use WORD for a few minutes, this program appears to have every conceivable word processing feature you could possibly want except a spelling checker. It will even integrate with Microsoft's FILE program to do mailmerge. If you do serious WORD processing, get this program!

For those of you who find MacWrite sufficient, a new version of it is scheduled for release in the near future. Two major changes include the ability to go to a specific page and

Continued On Page 64

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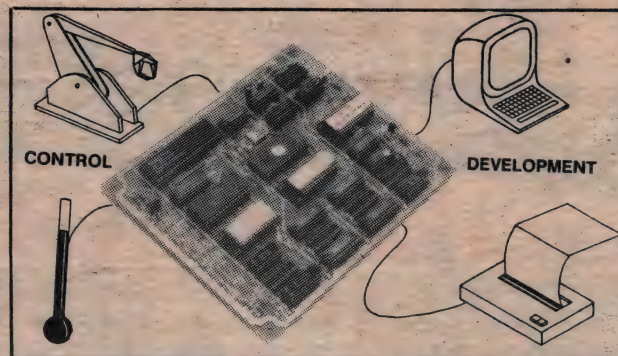

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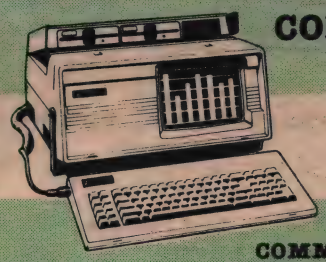

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MacUniverse
Continued From Page 61

an increase in usable file size. Fifty-page documents will be possible.

A new version of Microsoft Basic, version 2.0, is currently available. This upgrade includes a new manual. If you have an older version, you must send in the Microsoft registration card that came with your program to get the new version. If your registration card was received by Microsoft after October 1st, you will get the upgrade for free; otherwise, it is $50. All upgrades will be handled by Microsoft and not by the dealers.

Right now some of the best software available is free and can be found on CompuServe's Micronet Apple Users' Group (MAUG) at page PCS-51. A regular part of future MacUniverse columns will be a short description of two or three files available there. I will present what I consider to be the best and most unique.

To get this free software you need a communication program, a modem, and a modem cable. If your local dealer tells you only an Apple modem will work with the Mac do not believe him. You can save money and use any standard modem (e.g. Hayes Smartmodem, Novation Smart Cat, U.S. Robotics Password, and the like) so long as you have the proper cable. Ideally you should get a separate modem cable, but, if necessary, you can use an Imagewriter printer cable and a null modem. If you need a Macintosh compatible modem cable, want to save some money, and are willing to wait a couple of weeks for delivery, order a Mac modem cable for $35 from Bill Cook, aka Deputy Dawg, a sysop on the Apple SIG. Send a check to William R. Cook, 239 Delmarest Ave., Closter, N.J. 07624.

Speaking of modems, you will soon notice large and expensive advertisements for modems made especially for the Mac. These modems cost approximately $50—$100 more than the non-Mac modems; however, there is no difference between most of these modems and the non-Mac modems except for the modem cable. These Mac modems will come with a built-in cable. This means you cannot use the modem with another computer. To me this speaks of a conspiracy by the modem manufacturers to get us to buy a second modem. Unless you have money to burn, buy a generic modem and a separate modem cable. At least in that instance if you ever decide the Mac was a bad investment (heaven forbid), you have a modem you can use with another computer.

Once you get your cable you will still need a communication program. The program listed at the end of this column, BASCAP.BAS will get you started. It requires Microsoft Basic to work. If you do not have Microsoft Basic and are not willing to get it (which I recommend you do regardless), there are two programs currently available; MacTerminal ($99) from Apple Computer and Straight Talk ($79) from Dow Jones.

I have not tried MacTerminal so I have no personal knowledge about it. However, according to people who have used it, it works well. Straight Talk is an entirely different matter. I have used it and would only recommend it to my worst enemy. It was designed primarily for use with the Dow Jones News/Retrieval Network. It has a permanently open capture buffer and to save the buffer you have to log off the network. Other limitations include the inability to use your printer while on-line and no error detection when downloading. Worse of all, even if you save your files you may be unable to later access them. If you have ever used

Continued On Page 69

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1682	Buffered Grappler+ (16K)	239.00	178.00
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2805	Business Accountant 2/2E	255.00	196.15
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0050	Letter Perfect	149.95	103.60
0403	Lisa 2.6	79.95	61.75
0310	List Handler	79.95	53.35
0806	Locksmith 5.0	99.95	71.55
0982	Lode Runner	34.95	24.15
0194	Magic Window 2	150.00	103.85
0192	Master Type	39.95	27.65
0089	Maxell MD1 Disk-SS/DD (10)	46.50	21.55
2901	Memorymaster 2E/64K Exp.	169.00	140.85
2147	Micro Cook-Appetizers-2E	12.00	8.50
2146	Micro Cook-Soups/Salads-2E	12.00	8.50
0437	Micro Cookbook	40.00	27.65
2148	Micro Cookbook IIE	40.00	27.65
0692	Microline 92-P Printer	599.00	CALL
1509	Microline Ribbon	3.20	2.20
2958	Microline Tractor Feed	65.00	54.00
2802	Micromodem IIE W/Smartcom I	329.00	246.75
1294	Micro-Sci 2C Disk Drive	299.00	248.75
1316	Micro-Sci A2 Disk Drive	345.00	237.15
1347	Millionaire	59.95	41.50
1135	Minus Mission (Home)	34.00	23.55
1124	Mockingboard	129.00	105.50
0774	Mockinboard with Speech	195.00	162.50
1400	Moptown Hotel	39.95	27.65
0580	Multiplan (Apple DOS)	195.00	135.00
1341	Murder on the Zinderneuf	40.00	30.75
2903	Music Const. Set	40.00	30.75
0101	NEC 1215 Color Monitor	399.00	333.35
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0423	Nibble's Away II	69.95	53.25
2908	One On One	40.00	30.75
0563	Paddle-Adapple Combo	29.95	26.90
0568	Paper Graphics	49.95	34.60
2893	Paral' Printer Ext. Cable 6'	34.95	21.80
0635	Parallel Interface W/Cable	139.50	62.85
1418	Peanuts Picture Puzzlers	39.95	27.65
0616	Personal Touch	89.00	70.55
0088	PFS Access-2E/2C	70.00	48.50
1413	PFS File IIE	125.00	85.95
1415	PFS Graph IIE	125.00	85.95
1414	PFS Report IIE	125.00	85.95
0372	PFS Solutions/Ledger 2E	20.00	13.85
2809	PFS Write IIE	125.00	85.95
0495	Pie Writer 2.2 (40/80)	149.95	103.85
2907	Pinball Const. Set. (E.A.)	40.00	30.75
0659	Power of Visicalc	14.95	10.35
0584	Preschool IQ Builder 1	23.95	16.60
1196	Printshop	49.95	34.60
0349	Pro Blackjack — K. Uston	69.95	48.45
0461	Pronto DOS	29.95	20.35
1279	Prowriter Nylon Ribbon	10.00	6.65
0047	Quest	34.95	24.20
2111	Ramcard 16K (MPC)	99.00	60.25
0634	Ramcard 16K Microtek	129.00	71.55
0955	Ramcard 16K Prometheus	99.00	56.55
1386	Ramcard 16K Wizard	95.00	62.85
0140	Ramcard 16K-Microsoft	99.95	75.00
0771	RF Modulator-Internal	39.00	19.40
1450	Rhymes & Riddles	29.95	20.70
0503	Riteman Pl. ; Printer	399.00	312.80
0574	Rocky's Boots	49.95	34.60
0561	Sat Word Attack Skills	49.00	33.90
0133	Screenwriter II	129.95	89.00
0041	Sensible Speller IV	125.00	86.50

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1206	Sensible Speller-Pro DOS	25.00	86.50
0447	Sideways	60.00	40.00
0400	Silicon Salad	24.95	17.25
1340	Sky Fox	40.00	30.75
1373	Smartmodem 2C W/Smartcom I	399.00	265.60
1416	Smith Corona TP1 Ribbon	7.95	6.35
0465	Snooper Troops I	44.95	31.15
0271	Software Automouth	124.95	86.35
0250	Spellagraph	39.95	27.65
1291	Spellicopter	39.95	27.65
0631	Spelling Bee Games	39.95	27.70
2906	Standing Stones	40.00	30.75
1277	Starwriter Film Ribbon	5.50	4.50
0435	Step-By-Step	99.95	69.20
1447	Step-By-Step II	99.95	69.20
0100	Sticky Bear A B C	39.95	27.65
0099	Sticky Bear Numbers	39.95	27.65
0292	Story Machine	34.95	24.20
1326	Sundog	40.00	30.75
1374	Sup'r Mod — Universal	69.95	53.05
1445	Supertext Pro (40/80)	99.00	68.55
0524	Switch-A-Slot	179.50	161.10
0001	System Saver	89.95	69.20
1259	Taxan 12 in Amber Monitor	189.00	138.65
1258	Taxan 12 in Green Monitor	179.00	131.60
1528	Taxan Color Mntr. W/Audio	399.00	305.50
0236	Terrapin Logo	99.95	69.20
0137	TG Game Paddles	39.95	27.65
0136	TG Joystick W/Toggle	59.95	41.50
1330	TG Joystick W/Toggle IIE	64.95	45.00
1730	The Accountant	99.00	64.10
2597	The Accountant — V Calc. Infc.	20.00	15.40
0844	Think Tank/E	150.00	103.85
2897	Thunderclock Plus	150.00	121.80
2899	Time Master II	129.00	107.50
0462	Tip Disk #1	20.00	13.85
1193	Triple Dump	39.95	27.65
0544	Typefaces	20.00	13.85
0155	Typing Tutor 2	24.95	17.30
1237	Typing Tutor 3	49.95	34.60
2836	Ultima 3 (Exodus)	54.95	40.00
0559	Ultraterm	379.00	284.30
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2992	Verbatim DS/DD (10)	46.50	25.90
1721	Verbatim SS/DD Hardpack	35.00	23.35
0093	Verbatim SS/DD Softpack	34.00	18.00
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1082	Graphics Magician	49.95	34.60
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1099	Helix	395.00	273.45
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0696	Amdek 300A 12in Amber Mon	199.00	161.50
0104	Amdek 300G 12in Green	179.00	143.40
0272	Amdek Color III Monitor	479.00	383.25
0190	AST Comboplus 64K	395.00	296.55
0079	AST Megaplus 64K	395.00	296.55
0594	AST Sixpac Plus 64K	395.00	296.55
0918	ATI-Lotus 1-2-3 (PC XT)	75.00	51.90
0924	ATI-Supercalc	75.00	51.90
0925	ATI-Visicalc (PC XT)	75.00	51.90
0919	ATI-Wordstar Vols 1&2	75.00	51.90
2352	B-1 Nuclear Bomber	21.00	14.55
1281	Back to Basics Acct. 54S	295.00	187.25
0952	Bank Street Writer	79.95	55.35
0946	Barron's Study for the SAT	89.95	62.30
1512	BASF Disks SS/DD (10)	35.00	19.00
2546	Basic Compiler	395.00	273.50
2480	Battle For Normandy	39.95	27.70
2807	Book of IBM Software	19.95	12.80
2813	BPI Accounts Payable	595.00	411.95
2814	BPI Accounts Receivable	595.00	411.95
1068	BPI General Accounting	595.00	411.95
0948	BPI Inventory Control	795.00	550.40
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2592	Business Basic Compiler	600.00	415.40
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2370	CDEX Training for Visicalc	69.95	48.45
0971	CDEX Training-PC DOS 2.0	69.95	48.40
0959	CDEX Training-Supercalc	69.95	48.40
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1019	Chess	69.95	48.40
2775	Computer Baseball	39.95	27.65
2385	Computer Football	21.00	14.55
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2515	CP/M 86	60.00	41.55
2395	Creature Creator	39.95	27.70
2458	Crisis Mountain	35.00	24.25
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2426	Curse of RA	20.00	13.85
1043	Dark Crystal Adv #6	37.95	26.25
2571	Data Capture	120.00	83.10
2988	Database Manager II	295.00	204.25
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0934	Defender	34.95	29.10
2773	Delta Drawing	49.95	34.60
2659	Demolition Division	34.00	23.55
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1722	Disk Boxes (5 Color Coded)	25.00	12.50
2554	Dollars & $ense	165.00	114.25
1465	Dollars & Sense M/Forecast	179.95	124.60
0937	Donkey Kong	34.95	29.10
2405	DR Logo (CP/M 86)	149.95	103.85
2357	Draw Poker	21.00	14.55
0874	Dust Cover-PC Keyboard	7.99	5.30
2746	Early Games Children	29.95	20.75
2747	Early Games Matchmaker	29.95	20.75
2749	Early Games Music	29.95	20.75
2516	Easyspeller II (PC DOS)	225.00	155.80
0995	Easywriter II System	395.00	273.45

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1470	Elephant Disks DS/DD (10)	50.00	30.65
0092	Elephant Disks SS/DD (10)	37.00	17.95
2655	Enchanter	49.95	34.60
2481	Epidemic	34.95	24.20
0107	Epson MX-80 Ribbon	14.00	6.30
2575	Face Maker	34.95	24.20
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2918	Flip & File W/Lock (50)	39.95	23.85
1440	Flip-N-File (50 Disks)	19.95	11.30
2637	Fraction Fever	34.95	24.20
0721	Game Show	39.95	27.65
0665	General Ledger	495.00	288.50
0428	Hayes Mach II Joystick	44.95	31.15
0502	Hayes Mach III Joystick	54.95	38.05
1437	Head Cleaning Kit	29.95	17.30
0707	Hercules Graphics Card	499.00	374.25
2578	Hey Diddle Diddle	29.95	20.75
2513	Home Accountant Plus	150.00	96.15
2153	How To Use the IBM PC	69.95	48.45
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2527	Inventory Control	595.00	411.95
2451	Ken Uston's Pro Blackjack	69.95	48.45
2576	Kindercomp	29.95	20.75
2483	Koala Graphic Pad	124.95	93.70
2531	Koala Programmer Guide	15.00	11.25
2972	Labels 1-in White (1000)	9.95	6.75
0953	Learning Bridge Made Easy	79.95	55.35
1729	Lemon (AC Surge Protector)	59.95	41.50
0986	Link Module	295.00	204.25
2799	Lode Runner	34.95	24.20
0055	Master Match	39.95	27.65
2532	Master Type	49.95	34.60
0954	Mastering the SAT	150.00	103.85
2391	Mathblaster	49.95	34.60
0089	Maxell SS/DD Disks (10)	46.50	21.55
1008	Megawriter	99.95	69.20
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0585	Micro Cookbook	40.00	27.65
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2958	Microline Tractor Feed	65.00	54.00
1018	Microsoft Word	375.00	259.65
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2694	Riteman Blue Printer	479.00	378.25
0503	Riteman Plus Printer	399.00	312.80
2690	Riteman Ribbon	9.00	6.50
0390	Riteman Tractor Feed	41.00	31.40
2881	Sargon III	49.95	34.60
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2572	Snooper Troops #1	44.95	31.15

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2665	Spellakazam	39.95	27.70
2393	Spellicopter	39.95	27.70
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2622	STB Rio Plus W/64K	395.00	305.40
2625	STB Super Rio W/64K	419.00	323.95
2574	Story Machine	34.95	24.20
2653	Super Text Professional	99.00	68.55
0460	Supercalc 2	295.00	196.65
2638	Supercalc 3	395.00	273.50
2442	Suspended	49.95	34.60
1259	Taxan 12in Amber Monitor	189.00	138.65
1258	Taxan 12in Green Monitor	179.00	131.60
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1039	Tecmar 1st Mate W/256K	589.00	480.00
2421	Temple of Apshai	40.00	27.70
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2504	TG Joystick W/Toggle-IBM	64.95	44.95
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0335	Alligator Mix D	34.00	23.55
2713	Alphabet Zoo D	29.95	20.75
2714	Alphabet Zoo R	34.95	24.20
2913	Archon D	40.00	30.75
1342	Archon II — Adept (D)	40.00	30.75
2914	Axis Assasin D	35.00	26.95
1750	B-1 Nuclear Bomber C	16.00	11.10
0181	Back Basics Acct. Sys.	195.00	123.75
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1749	Dust Cover - Commodore 64	7.99	5.75
2340	Early Games Children D	29.95	20.75
2670	Early Games Piece Cake D	29.95	20.75
0546	Elementary Commodore	14.95	11.50
0092	Elephant Disks SS/DD (10)	37.00	18.20
1337	Elephant Disks SS/SD (10)	34.00	17.95
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1437	Head Cleaning Kit	29.95	17.30
2137	Hellcat Ace D	29.95	23.05
0334	Hesmodem 2 (D)	119.97	97.40
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2868	In Search Of/Amazing D	39.95	27.65
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1839	Jumpman D	40.00	27.70
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MacUniverse
Continued From Page 64

another communication program regularly, Straight Talk will quickly frustrate you.

If you use BASCAP.BAS you do not need to type any lines that have a "Rem" after the line number. Save the program as BASCAP. Type "run" and you will now have a 300 baud terminal emulator that you can use to log onto CompuServe, the Source, Dow Jones, and the like. Once you get BASCAP up and running and if you have access to CompuServe, go to MAUG. If you are not currently a member leave a message to one of the Sysops to join. There is no fee. Once you become an authorized member (takes about 24 hours after you leave the message) you can download program from their database. Go to the XA0 database and type TYP MACTEP.GET.This will print out an instruction file on how to use BASCAP.BAS and how to use it to get MacTep. Once you have BASCAP.BAS running go to the XA8 database and download two files MACTEP.187 and MACTEP.NOT. The first program is the MacTep program. The second is its accompanying instruction guide.

MACTEP.187 is a Macintosh terminal emulator which can work at speeds up to 9600 baud (I use it at 1200 baud on CompuServe and Dow Jones all the time). MACTEP.187 allows downloading to the clipboard, disk, or printer. It also supports X-On/X-Off throttling and prompted uploading. Most importantly MACTEP.187 allows downloading of text files (Option R) and BASIC programs (Option B). Using another program, BINHEX.hex (which will be discussed in detail next month), MACTEP.187 allows you to download MacWrite and MacPaint documents; machine language programs, and much more.

If you do not have access to CompuServe, MACTEP.187 can be ordered for $5. Send a check, a blank Macintosh diskette, and a self-addressed return mailer to:

MACTEP Offer
Brothers Associates
197 Old Connecticut Path
Wayland, MA 01778

Your disk will be returned to you with the program and instruction file.

Finally, if you are looking for the perfect gift for a fellow Mac owner, take a look at the Mouse-House. This is a cloth cover that goes over the Macintosh mouse and makes it look like a real mouse! With a suggested retail price of $6.95, this is a perfect present for the person who has everything. If your local computer store does not have one, it is available from American Covers, P.O. Box 1796, Sandy, Utah 84091 (801) 566-3100. ●

BASCAP.BAS PROGRAM

```
100 REM BASIC Capture - Version 1.2
110 REM By Christopher Allen 76703,472
120 REM Modified by Dennis Brothers 70065, 172 - 11-July-84
140 REM Based on MacTEP by Dennis Brothers (c) 1984 Brothers
        Associates
190 REM Usage : Type this program into MS-BASIC. It is not
        necessary to type
200 REM the lines which have REM after the line number. Save as
        BASCAP.
210 REM Works as a 300 baud terminal emulator. Run BASCAP,
        use it to
220 REM  log into remote system. Type command-B when ready to
        capture
230 REM  a BASIC program. When asked, give name file will have
        on Mac.
240 REM  Then give remote system command to type out desired
        program.
250 REM Type command-B again when download has finished.
260 REM Download additional programs, if necessary, giving them
        different names.
270 REM  Log off remote system. Type Command-X to exit to
        BASIC.
280 REM Captured files are saved in ASCII format. Load each into
290 REM BASIC and re-save to get clickable BASIC programs.
300 REM
310 REM Modem connections
305 REM  (Mac -> Modem) : 1->1, 3->7, 5->2, 6->20,
320 REM                   7->8, 8->7, 9->3.
330 REM
340 DEFINT A-Z :  DIM ML(25) : CALL TEXTSIZE(9) : CALL
        TEXTFONT(4)
350 OPEN "COM1 : " AS #1 :  FOR I = 0 TO 25 : READ ML(I) :
        NEXT I
360 DATA 20054, 0, 7534, 11, 10, 16942,  11,  7534, 9, 8, 16942,
        9, 124
370 DATA 1792, 13294, 10, 176, 2, 13294, 8, 176, 2, 636, -1793,
        20062, 20085
380 SB! = VARPTR(ML(0)) :  CALL SB!(12, 126) : CALL SB!(13, 1)
390 X = 0 :  DL = 0 : L$ = "" : WHILE -1
400 WHILE LOC(1) :  IF LOC(1)>32 AND NOT X THEN PRINT #1,
        CHR$(19); :  X = -1
410 C = ASC(INPUT$(1,  1)) AND 127 : IF C = 10 THEN 480
420 PRINT CHR$(C); :  IF NOT DL THEN 480
430 IF C<>13 THEN L$ = L$+CHR$(C) :  GOTO 480
440 IF NOT X THEN PRINT #1,  CHR$(19); : X = -1
450 IF L$ = "" THEN 480
460 C$ = LEFT$(L$,  1) : IF (C$<"0") OR (C$>"9") THEN L$ = "" :
        GOTO 480
470 PRINT #2,  L$ : L$ = ""
480 WEND :  IF X THEN X = 0 : PRINT #1, CHR$(17);
490 C$ = INKEY$ :  IF C$ = "" THEN 530 ELSE IF C$ = CHR$(24)
        THEN END
500 IF C$<>CHR$(2) THEN PRINT #1,  C$; : GOTO 530
510 DL = NOT DL : IF NOT DL THEN CLOSE #2 :  PRINT : PRINT
        "Got file" :  GOTO 530
520 PRINT :  LINE INPUT "Mac file name : "DF$ : OPEN DF$ FOR
        OUTPUT AS #2
530 WEND :  END
```


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10:00–11:30	Industry Forum: the outlook for the Macintosh in the office
11:30–12:00	Industry Roundtable Discussions
12:00–1:00	(lunch break)
1:00–2:30	Industry Forum: developing software for the Mac: opportunities and pitfalls
2:30–3:00	Industry Roundtable Discussions
3:00–4:30	Industry Forum: the outlook for the Macintosh in the home and school
4:30–5:00	Industry Roundtable Discussions

Friday, February 22: Business/General User Sessions

12:00–2:00	Keynote Presentation: the future of the Macintosh and what it means for you
2:00–3:00	How to Start and Survive in Business with Your Macintosh
	Maximizing MacPaint®
	The Mac Clinic
3:00–4:00	Interfacing the Mac with Other Apples
	A Guide to Better Business Graphics
	How to Create Useful Documentation
4:00–5:00	What the Fat Mac Can Do
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Saturday, February 23: Education/General User Sessions

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	All About MacPascal®
	How to Write User-Friendly Software
2:00–3:00	Developing University Courseware with the Mac
	Data Base Management of the Mac
	How to Become a Wizard at Machine Language Programming
3:00–4:00	Understanding the Power of Peripherals
	Getting the Most Out of Spreadsheet Programs
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4:00–5:00	How To Get Your Programs Published
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FEBRUARY 21–23, 1985
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Dow Jones STRAIGHT TALK: Software Review

by L.J. Kutten

With the name Dow Jones on a program, one would assume that the program has been carefully thought through and implemented so that it is easy for the novice to use yet simple enough not to get in the way of an experienced user. This is not the case with Dow Jones STRAIGHT TALK software. This is a $79 communication program for the Apple Macintosh computer which is designed primarily for communicating with the Dow Jones News/Retrieval Network but is also capable of accessing other on-line services such as CompuServe, the Source, and Dialog.

STRAIGHT TALK comes on a non-copy protected diskette, an 82-page manual, and a registration card that entitles the sender to receive one free hour of unrestricted use on the Dow Jones News/Retrieval Network. To utilize STRAIGHT TALK, the user needs a 128K Macintosh, a modem, and, if you want to print out material, an Imagewriter printer.

Configuring STRAIGHT TALK to talk to Dow Jones News/Retrieval Network is simple. By following the detailed instructions the user can create one automatic log-on file to the Dow Jones Network at either 300 or 1200 baud. This file will do all necessary inputs, including password, necessary to get access to the Dow Jones Network. To log on to a second baud rate or any other on-line service requires a second procedure which is not as automatic. While the program will auto dial the access telephone number, it cannot enter a user ID number or a password. After any necessary sign-on, a dialog box appears and tells you to log onto the service. You must move the mouse to either the "LOGGED ON" or "CANCEL" box to get rid of it. If you click the "LOGGED ON" box still another dialog box appears and tells you that you are logged on. Hit return or click the "OK" box and the user can now complete the necessary log on procedures.

In building the automatic log on files, STRAIGHT TALK supports a wide variety of communication protocols. It can use (1) four communications networks (Telenet, Tymnet, Uninet, and Datapac); (2) three auto-dial modems (Apple, Hayes Smartmodem, and Novation Smart-Cat); (3) two baud speeds (300 or 1200); and (4) either Touch-Tone or rotary dialing. If the first network is busy or is otherwise unaccessible, the program automatically tries the other two.

Using STRAIGHT TALK

Using STRAIGHT TALK with Dow Jones News/Retrieval Network is very simple. The user does not have to remember what command is necessary to get to any particular Dow Jones News/Retrieval Network database. Merely move the mouse to one of the five pull down menus (DJ News, Quotes, Investment, General, or & More) and click. From there, the user is given a series of databases to choose from; move the mouse over the option and click and the command is given to send you to that database. The same list of commands, along with a brief summary of each, can be found on the one page handout "Summary of Information Services" available free on request from Dow Jones.

This program starts with the idea that using the Macintosh mouse and pull down menu will more easily allow a user to work his way around the Dow Jones News Network. By using menus, the user will not have to remember the codes necessary to access various codes.

There are two problems with this approach. First, it assumes the user will be accessing most of the databases occa-

Continued On Page 74

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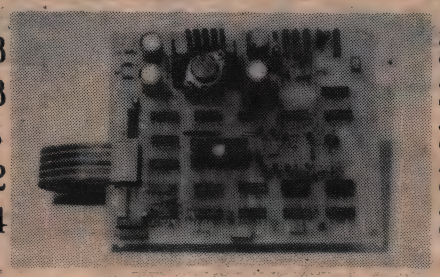

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Straight Talk
Continued From Page 72

sionally. If a subscriber uses only a few databases, it is far quicker and easier to type the command than use the mouse. For example, to get a current quote using the mouse, you must move the mouse to the Quote Bar, click the mouse to bring down the menu, move the mouse to cover current quotes, click the mouse again to get to the current quote database and then finally type in the request. Alternatively, the user can type (1) "//cq" to get the current quotes database and then request the particular quote, or (2) merely type a comma and the stock symbol (e.g. ",GM") and get the current quote. Secondly, the program assumes the Dow Jones News/Retrieval Network network will not add many new features. If many new features are added, the program quickly becomes dated because the user cannot use the pull down menus to access the new databases. Already my review copy is outdated because it does not have the "MEDX," a medical reference service, available.

The Manual: The manual provided with STRAIGHT TALK is 82 pages and explains the program in detail but it provides no information on how to use Dow Jones News-/Retrieval Network. This is perplexing when one examines communication packages for other computers. For example, Radio Shack's Videotex Plus package includes a 32-page manual that gives the user basic information on how to access (1) a particular news story on a company, (2) detailed financial statistics on a company, (3) current and historical quotes for bonds, mutual funds, options, treasury bonds and notes, (4) Media General for detailed fundamental and price information, and (5) Wall Street Week. It also pro-

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We have 8Kx8 static RAMs: HITACHI HM6264-P-15, HM6264LP-15, and the TOSHIBA TC5565PL-15. These are 28 pin devices compatible with 2764 EPROMs. Both the Hitachi and Toshiba parts are pin compatible. After a brief discussion by phone with both company offices, we are under the strong impression the Toshiba part is slightly better. Both brands have two chip selects, and go into low power mode when only either chip select is disabled. Both Hitachi devices, the P-15 and LP-15, are the very same part, made the same way at the same time, however, the LP device is culled out or tested as being a lower power device. The Toshiba PL-15 and Hitachi LP-15 appear to have identical specs.

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**CAUTION: Do not program the 2732A in a 2732 socket: The suffix A requires 21 v max programming voltage vs the standard 25 v.

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Straight Talk
Continued From Page 74

vides a list of subject area codes for news and industry research. In all fairness to STRAIGHT TALK and Dow Jones, this information is available on-line. But the difference is that when on-line the user has to pay for it, rather than already having the manual that describes it. It should also be noted that a Dow Jones representative told this reviewer at a trade show that sending in the registration card will cause Dow Jones to send a 320-page manual to the registrant. However, there is nothing in the STRAIGHT TALK manual or on the user registration card to so indicate. If the manual is not sent free of charge, it is available for an additional $10 from Dow Jones.

Two Major Problems

Finally, STRAIGHT TALK has two major problems that totally negate anything positive you can say about it. These problems deal with its capture buffer and printing ability.

Capture Buffer: STRAIGHT TALK's capture buffer is permanently open and it fills quickly. It is only 13K big and at 1200 baud takes less than 6 minutes to fill up. Once full, the program stops and asks if you want to save the buffer. If you want to save it, you must log off the network, and enter the option called "PROCESS LAST SESSION" from the main menu. There the user can review the entire buffer, print it out, or save it under a file name. If the user does not log off, information scrolls out of the buffer. There is no way to empty it totally.

If you only use the Dow Jones Network, this permanently open buffer may not present you with much of an inconvenience. But it presented a large obstacle to this reviewer. Many times I would want to save material larger than the buffer. In those instances I had to first log off the network to save the first part, then relog onto the network, reenter the particular database I was working in and then relocate the material I wanted. It would be far simpler if STRAIGHT TALK had a quick way of storing the buffer on disk and then emptying it while on-line.

Due to the nature of STRAIGHT TALK's permanently open capture buffer, do not attempt to use it with other networks for downloading programs, hex files, and the like. The program has no error checking when downloading and it stores everything that it sees.

Printing: You cannot use the Imagewriter printer to make a hard copy of the screen display as it is being transmitted. If the user wants to get hard copy of all or part of the data received, he must log off the network and select the print option under the "PROCESS LAST SESSION" command. This allows you to print out the entire capture buffer or selected portions of it. When printing the user is given a similar menu to MacWrite. But that is where the similarity ends. If the user only wants to print a selected portion of the file he must (1) either delete the unwanted material prior to printing or (2) guess its page location. I say "guess" because the program does not show you where page breaks occur. If you exit the program before printing, you cannot use STRAIGHT TALK's printing capabilities as it is only capable of printing the last session. According to STRAIGHT TALK's manual, this limitation is not so bad because the user can copy the processed file over to MacWrite and use it to print it out. This is not necessarily true. MacWrite's maximum file size is smaller than STRAIGHT TALK's. If the STRAIGHT TALK file is too big, MacWrite will not handle it. As far as can be determined, the file is not permanently unavailable.

Conclusion: If you only use Dow Jones News/Retrieval Network and are only on-line for a few minutes at a time, this program would be worthwhile for you. But its numerous limitations—inability to do automatic log on to other on-line services, its permanently open capture buffer, and its inability to simultaneously print while on-line—make it a bad buy for a person looking for a general purpose communication program. ●

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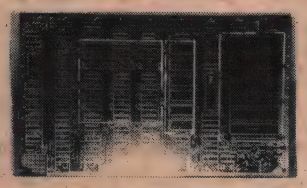

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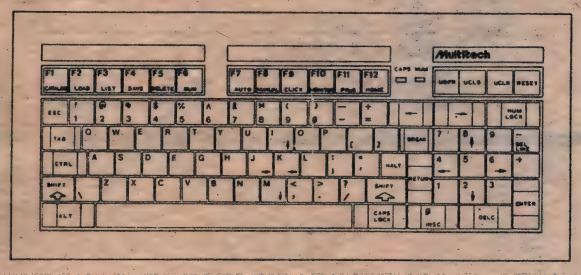

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All of these bare PCB's come with a parts list and placement diagram. In some cases you will also need software/firmware to operate these cards. This must be composed or found from a users group, we will not supply it.

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The following kits contain all the soldered in parts needed to build the appropriate PCB. That is: resistors, capacitors, IC sockets, switches, DB-25 Conn, ribbon cable, SIPS etc. to build the entire card. NOTE: THERE ARE NO IC's IN THESE KITS - YOU MUST BUY THE IC's FROM AN IC SPECIALIST. We have placed sample orders with several IC sellers in the COMPUTER SHOPPER and we got the best price, quality and deliver from these two suppliers:

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By now all of you have heard of the APPLE SEED by RAY KOSMIC, it knows-all, tells-all about the 6502 Mother boards. Well we now sell this book and it is well worth the paltry $9.95 we sell it for.
APPLE SEED $9.95
KOSMIC is at it again, he has a book out that has all the data on the 50 most popular Apple® peripheral cards. Each card has a pictorial parts layout diagram and complete parts list to make service and parts location easy as pie. That works out to about 20¢ per card, a real cheap price for all that is in there.
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FILEVISION — A Visual Database for Macintosh

by Patti Patch

Since Macintosh is a computer that uses pictures in place of words wherever possible, it follows that a good database for Mac would follow the same principles. Now databases are among the most verbal types of software. You must select data, using selection criteria, and answer many questions in order to sort and print reports. How do you do this in a non-verbal system? Telos Software Products has found the answer and produced a visual database for Macintosh called FILEVISION. It is a new concept and may be as revolutionary as VisiCalc was in its time.

Filevision uses a complete new set of terms to describe its operation, throwing aside the familiar database descriptions that have been left over from mainframe DBMS days. A database is called "A Drawing File;" a record is called an "Object" and up to 999 objects can be stored in a drawing file. The general idea is to have your object look like the thing you store in the drawing file. The manual illustrates this with cases and bottles of wine. You can have up to 16 "types" of objects in each drawing file. The manual also illustrates this with a map of Arizona where the types of objects might be counties, national monuments, national parks, highways, etc. In Filevision, the selection process is called "Highlighting" and up to four criteria can be used with the logical operator AND connecting them. You can also use many relational operators and three "wildcard" characters. One problem is that there is no "OR" operator. You can probably get around this, but the manual does not show you how.

The manual is excellent, well written and well illustrated. It is both a reference and a tutorial, although the reference part is much weaker. The tutorial takes you on a "Tour" of a wine cellar where cases of wine are stored. These are white or red wines of different age and brands. The cases look like cases and the bottles look like bottles. The tour lets you add wine to your cellar, highlight specific wines and print a wine list, represent wines with special symbols with different meanings. You add to the wine cellar by adding a new type—a case of wine. When you are finished with the tour, you have learned to use Filevision.

After I took the tour, I decided to see how well I had absorbed the lessons. I set up my own drawing file which was an inventory of our building. To do this I set up a map of the building showing every office and its contents. This was much better than a listing such as you get with any other database, because you could actually see where everything was. With other databases you overlook something, but with Filevision you are actually looking at it and you do not forget. For example, you know there is an office desk but you have omitted it from the inventory. With the visual file, you can add it to the room as soon as you notice it is missing.

About the only problem I had with Filevision was a result of not having enough storage on one disk drive. In addition, you cannot set up a report format and save it as a report file. You have to start over each time. I have a feeling that this will be corrected in future revisions because it is so basic to a database system.

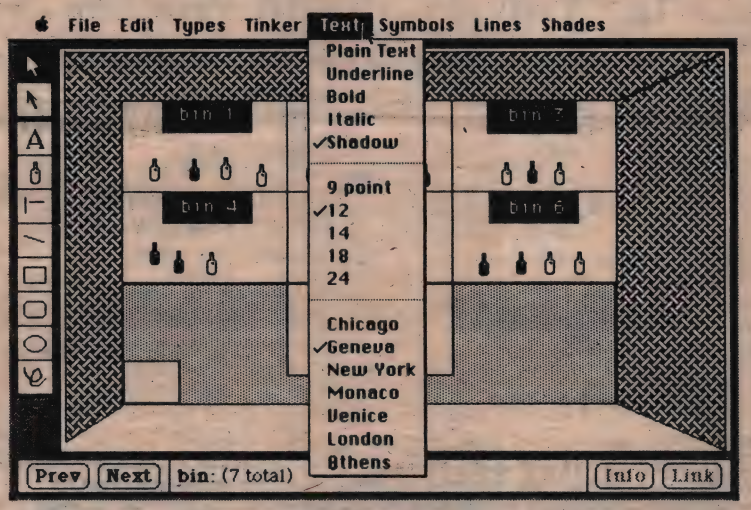
Conclusions:

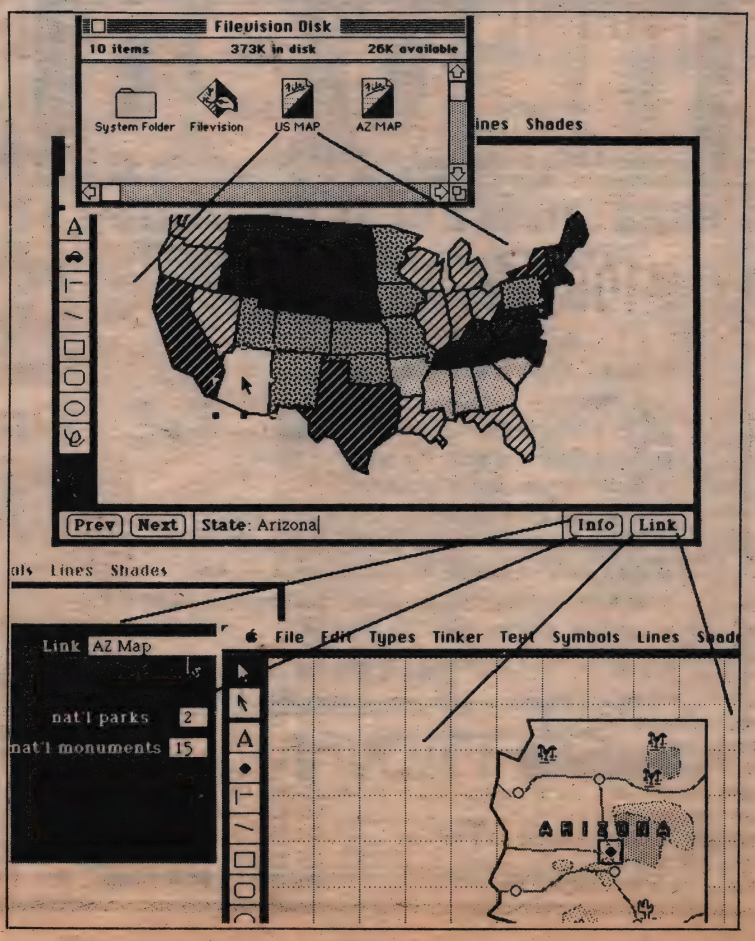
For the novice Macintosh owner, this is the ideal database system. It has more advantages than defects and I suspect that it will become a standard for this type of program. For those with more complex needs and a Fat Mac with at least two drives, I suspect that there are better databases that will hold many different records. In spite of this, I think that many people will use Filevision for simple applications no matter what other database program they buy.

FILEVISION — Visual Database for Macintosh
Telos Software Products
3420 Ocean Park Blvd.
Santa Monica, CA 90405
(213) 450-2424

Price: $195

WARNING: THIS IS A COPY PROTECTED PROGRAM. They charge $15 for Master Backup Copy; other user created copies require Master for Validation; however, they will replace physical defects free within 90 days of purchase. ●





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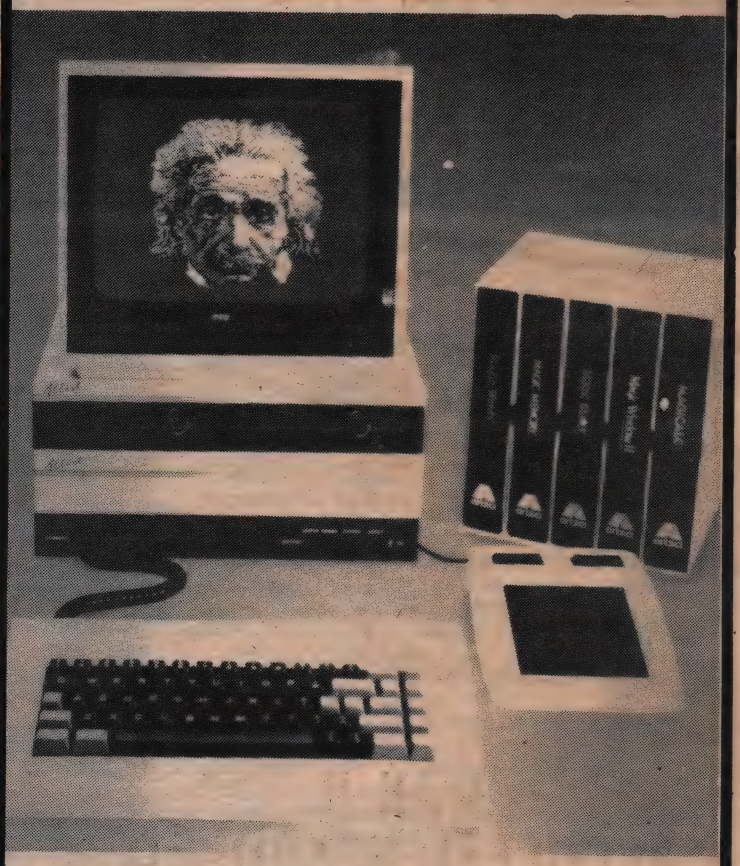

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Hayes Smartmodems Compatible With Macintosh

Hayes Microcomputer Products announces that the freestanding Smartmodem 300 and Smartmodem 1200 add telecomputing capabilities to Lisa and Macintosh computers.

Both Hayes modems are compatible with MacTerminal, Apple's telecommunication software for the MacIntosh and Lisa computers. Hayes modems in conjunction with the software provide the "handshaking" necessary for computers to communicate over the telephone lines.

The Smartmodem 300 is a direct-connect modem operating on the Bell 103 standard. The modem features full- and half-duplex operation and unattended answering and calling abilities at speeds from 0-300 bps. Users can call out using either Touch-tone or pulse dialing and monitor the progress of the call with bright LED lights and a speaker.

The Smartmodem 1200, operating on the Bell 212A standard, shares the same features as the Smartmodem 300. The modem also offers automatic speed selection and transmits at 0-300 and 1200 bps.

Both the Smartmodem 300 and the Smartmodem 1200 use a 25-pin connector. The auxiliary chart shows the configuration needed to connect the Smartmodems to the 9-pin receptacle used by the Apple computers.

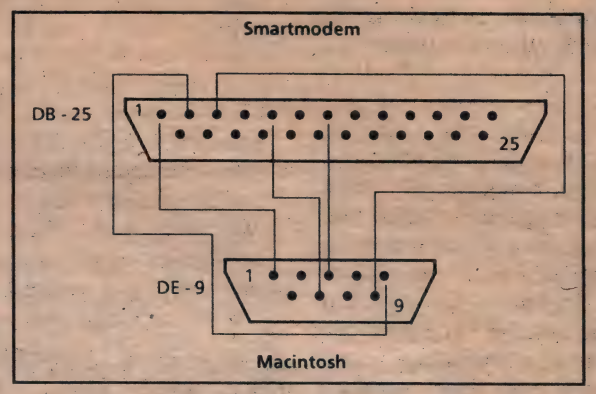
The quality and reliability of Hayes Smartmodems have become the de facto standard for data transmission. The modems are intelligent systems that can be controlled by a programming language and can send result codes either in decimal or word form.

The Smartmodem 1200 retails for an estimated $699 and the Smartmodem 300 sells for approximately $289. Both modems have a two-year limited warranty and come with a power pack, easy-to-use owner's manual and a modular telephone cable to connect the unit to the telephone line.

For more information concerning the Smartmodem 1200, Smartmodem 300 and other Hayes products, contact Hayes Microcomputer Products, 5923 Peachtree Industrial Blvd., Norcross, GA 30092. (404) 449-8791.

Mention that you read about it in Computer Shopper. ●

PIN-TO-PIN CABLE CONFIGURATION FOR THE HAYES SMARTMODEM AND APPLE MACINTOSH



Smartmodem			Macintosh	
Connector	Pin #	Function	Pin #	Connector
25-Pin D-Shell Connector (Male)	1	Chassis Ground	1	9-Pin D-Shell Connector (Male)
	7	Signal Ground	3	
	2	Transmit Data	5	
	5	Optional Clear to Send	7	
	3	Receive Data	9	

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IBM

* **IBM** and Leading Edge Computers ..... Call
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APPLE

* **Z80** Card for II+ & IIe (Microsoft comp.) $50
* **80** Column Card with inverse & cable (Videx comp.) $75
* **Graphics** Printer Card with cable (Grappler + comp.) $65
* **Graphics** Printer Card with cable and 32K buffer (Micro Buffer II comp.) $120
* **128K** RAM Card (Titan, Saturn comp.) w/3 disks & manual $180
* **Disk** Controller Card (Apple comp.) $40
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The Typing Tutor III Program Now Available For The Apple Macintosh Computer

The Apple Macintosh version of the Typing Tutor III program, an advanced touch-typing instruction program, is now available.

The Typing Tutor III program takes advantage of the Macintosh's high speed processor, which allows the program's Time Response Monitoring technique to monitor student response time and error rate with greater precision. As a result, Typing Tutor III is uniquely able to adapt lessons to each individual's specific typing skills and learning needs.

The program takes advantage of the Macintosh's bit-mapped graphics and uses icons that are mouse or keyboard selectable to indicate menu choices. A high-resolution image of the keyboard appears on the screen, along with explanatory prompts, full on-demand help screens, and progress test results, that are displayed as bar charts showing speed and accuracy improvements for each key.

A fast action arcade-style game, Letter Invaders, provides an entertaining break from drills and lessons while further developing speed and accuracy. Letter Invaders uses the Macintosh's high-resolution graphics to create animated letter explosions, adding to the excitement of the game.

Typing Tutor III for the Macintosh will be available in computer specialty and consumer electronics stores, mass merchandisers, and toy, book and video outlets nationwide.

The suggested retail price for the Macintosh version is $59.95. The Typing Tutor III program is currently available for the Commodore 64, IBM PC and Apple II series of computers with IBM AT, PCjr and MSX versions under development.

For additional information, contact Simon & Schuster Electronic Publishing Group, Simon & Schuster Building, 1230 Avenue of the Americas, New York, NY 10020.

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MISCELLANEOUS

A Simple One-Chip Control Circuit

by L. Van Delray

My computer-controlled crystal ball probably needs an optical alignment and its bit bucket cleaned because during a session the other night, I thought I saw the ghosts of uncounted numbers of computers—ZX80s, ZX81s, VIC-20s, elderly Ataris, and assorted unknown brands—all crying out to be free from the dusty shelves in basements and attics where they have been relegated.

Their common complaint was that even though they were outmoded, undermemoried, had limited I/O, and only a very simple built-in BASIC they could still lead useful lives if they were given half a chance.

They insisted that a computer can be used for more than playing games, word processing, running spreadsheets, and controlling disk systems.

A computer, even a basic one, can also be an excellent general-purpose controller for electrical appliances around the home, for electronic hobby use, to take care of tropical fish tanks or hothouses, and a broad variety of electrical things that can be controlled by timed on/off type signals. This partial list shows that even a computer that you have no further use for (although it must be working) is capable of doing many useful tasks.

Its hard to believe that you could control up to eight electrical devices with your computer and a one chip controller! However Luis Van Delray the Mexican/Dutch genius has come up with an article that tells you how to do just that. One never knows what mad device will emerge from his lab on the Island of Dr. Moreau. Does one?

All you need is a controller that can be driven by the computer. However, most commercially available controllers are relatively expensive, require complex software, and the user is not really sure that he needs a controller.

In this column, I will discuss the basics of a low-cost piece of hardware that will work with a minimum of software, so simple that even a "non-expert" can use it. Although construction details are not provided, a hardware-oriented reader will have all the information he needs to build this project.

The one IC controller, whose schematic is shown in the accompanying illustration, can be directly interfaced with the eight data lines of any computer, preferably at a parallel (printer) port, and the eight controlled outputs can be turned on and off under very simple software.

The chip we will use for our low-cost controller is the Signetics NE5090 or NE590/591 addressable relay driver—the high-current rela-

Continued on page 84

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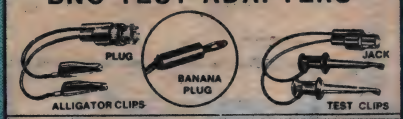
BNC TEST ADAPTERS



MODEL	TYPE	TERMINATION	1-9
BC30	Plug	Banana Plug	7.75
BC40	Plug	Test Clip	8.95
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BC60	Jack	Banana Plug	5.75
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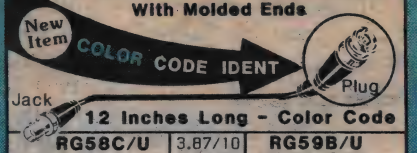

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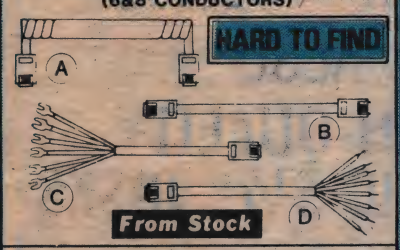

MODEL-ft.	Code	# Wires	1-9	10-24
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TDC-001-10	A	8	4.95	4.36
TDC-003-2	B	8	2.95	2.60
TDC-003-7	B	8	3.55	3.12
TDC-003-14	B	8	4.85	4.27
TDC-003-25	B	8	6.95	6.12
TDC-027-7	B	6	2.95	2.60
TDC-027-14	B	6	3.85	3.39
TDC-027-25	B	6	4.95	4.36
TDC-004-7	C	8	2.95	2.60
TDC-004-14	C	8	3.95	3.48
TDC-028-7	C	6	2.55	2.24
TDC-028-14	C	6	3.45	3.04
TDC-005-2	D	8	2.25	1.98
TDC-005-7	D	8	2.95	2.60
TDC-005-14	D	8	3.95	3.48

Rotary-Scale Clamp-On Instruments

The most advanced Clamp-On Tester with many performance features • Range selection knob automatically advances the specific scale • Easy reading – no confusion • Accurate AC current measurements assured because of round clamp core with built-in balanced coils • Most reliable taut band, internal core-magnet meter • Trigger lock device, retains reading for use in hard to get places • Automatic "Zero-Adjust" ohms scale • Overload protection up to 150% for one minute ON ALL RANGES • Test leads lock-in for added safety • Accuracy ±3% full scale on all ranges • Accessories included: carry case, test leads and instructions • Size: 8.25x3.25x1.4" • Reasonably priced

10 USEFUL RANGES	
AC Current	6, 15, 60, 150, 300, 600A
AC Voltage	150, 300, 600V
Resistance	0-20kΩ(1kΩ center scale)

Price Cut 65%

57.95/ea 47.60/10
55.55/3 42.85/25

Reg $119.00

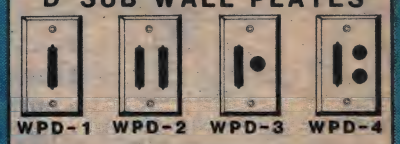
THIS MONTH'S SPECIAL!

BRUSHED STAINLESS WALL PLATES

Blank MODEL WP $3.59

Supplied with Matching Screws

D-SUB WALL PLATES



MODEL	Knockout	1-9	10-24
WPD-1	(1) D-25	3.95	3.75
WPD-2	(2) D-25	3.95	3.75
WPD-3	D & Coax	3.95	3.75
WPD-4	D & Coax	3.95	3.75

COAXIAL WALL PLATES

WPC-1	(1) Coax	3.95	3.75
WPC-2	(2) Coax	3.95	3.75
WPC-4	(4) Coax	3.95	3.75
WPC-10	IBM Twinax	3.95	3.75

NOTICE: Wall plates have D-Holes to accept feedthru adapters as shown below. Prices are for plates only.

TELE DATA JACK

6 & 8 POSITION

MODEL	TYPE	POS.	1-9	10-24
TDD-22	Wall	8	7.50	6.60
TDD-26	PC	6	2.95	2.60
TDD-28	PC	8	3.95	3.48

MALE D-SUB HARDWARE

STD 4-40 SET

COMPARE PRICES

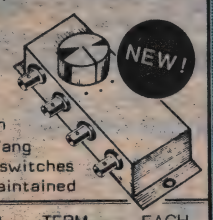
COMPARE

Multiples of 50 Only

MODEL	FINISH	50-450	500	1200
SDF-1	Chromate	.19	.18	.17
SDF-2	Tin Plate	.19	.18	.17

DATA COAXIAL SWITCH

- Rugged Build
- Fully Shielded
- AB or ABC Types
- Low Contact Res
- Mounting Flanges
- Metal Construction
- BNC or TNC & Wang
- Center conductor switches
- Shield isolation maintained



MODEL	FUNCTION	TERM.	EACH
DS12B	SPDT AB	BNC	65.00
DS22B	DPDT AB	BNC	79.00
*DS22BT	DPDT AB	BNC-TNC	85.00
DS13B	SPDT ABC	BNC	75.00
DS23B	DPDT ABC	BNC	94.00
*DS23BT	DPDT ABC	BNC-TNC	99.00

*For Wang Devices-Switches Transmit & Receive Cables Simultaneously

Qty. Discounts & Custom Types Available

RS-232 CABLES

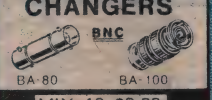
25 CONDUCTORS

SPECIAL!

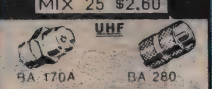
MODEL-ft.	1-9	10-24
C25-2.5	19.88	18.09
C25-5	21.16	19.26
C25-10	23.76	21.62
C25-15	26.36	23.99
C25-25	31.56	28.72

SPECIFY: Male-Male or Male-Fem

- POPULAR - GENDER CHANGERS

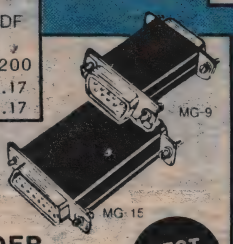


MIX 10 $2.80
MIX 25 $2.60



YOUR CHOICE 2.95 ea

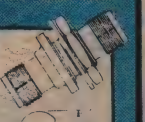
GENDER CHANGERS



BEST GRADE

MODEL	GENDER	1-9	10-24
MG-9F	F-F	15.95	14.51
MG-9M	M-M	15.95	14.51
MG-15F	F-F	18.95	17.24
MG-15M	M-M	18.95	17.44

CONNECTORS FOR L-COM WALL PLATES



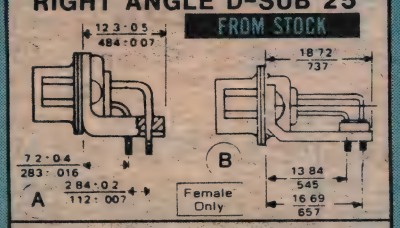
MODEL	TYPE	1-9	10-24
BA-1087	BNC	6.25	5.94
BA-2301	TNC	6.45	6.13

RS-232 D-SUBS

SD-25P2	Male	3.65	3.47
SD-25S2	Female	4.85	4.61

RIGHT ANGLE D-SUB 25

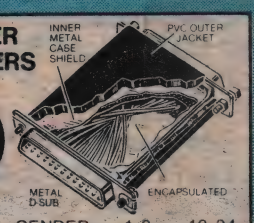
FROM STOCK



MODEL	TYPE	1-9	10-24	25
SD25S-RA	A	7.90	7.51	6.95
SD25S-R2	B	7.90	7.51	6.95

GENDER CHANGERS

BEST GRADE!

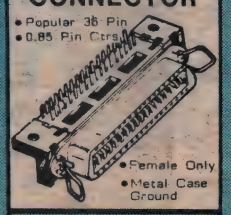


MODEL	GENDER	1-9	10-24
MG-25F	F-F	23.95	21.79
MG-25M	M-M	23.95	21.79

ATTRACTIVE Prices for QTY Users

CENTRONICS RT ANGLE PC CONNECTOR

- Popular 36 Pin
- 0.85 Pin Ctrs

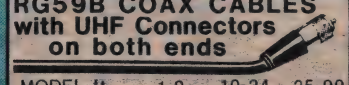


SCARCE ITEM

CEN36F-RA		
1-9	10-24	25
8.95	7.88	8.50

DEALER REQUESTS ATTENDED

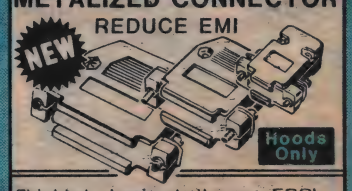
RG59B COAX CABLES with UHF Connectors on both ends



MODEL-ft.	1-9	10-24	25-99
CB59B-1	3.55	3.23	3.05
CB59B-1.5	3.70	3.37	3.18
CB59B-2	3.85	3.50	3.31
CB59B-3	4.15	3.78	3.57
CB59B-4	4.45	4.05	3.83
CB59B-5	4.75	4.32	4.09
CB59B-10	6.25	5.69	5.38
CB59B-15	7.75	7.05	6.67
CB59B-25	10.75	9.78	9.25
CB59B-50	18.25	16.61	15.70
CB59B-100	33.25	30.26	28.60

METALIZED CONNECTOR

REDUCE EMI



Shielded plastic shell meet FCC's Class B. Solves interference problems. Designed to reduce the cost and weight. The compucable shell is made of fire resistant plastic (UL94VO) and is plated with copper for shieldeing and then with nickel: **All hardware included**

MODEL-SIZE	1-9	10-24	25
SDC- 9M	1.75	1.66	1.54
SDC- 15M	1.85	1.76	1.63
SDC- 25M	1.95	1.85	1.72

Supplied w/hdr - QTY pricing also

MINIMUM ORDER $25.00 • ADD $4.50 Shipping & Handling • You're Welcome to Visit Us

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L-COM® Shopper's Guide

Products for the ELECTRONIC & COMPUTER Industry

RS-232 MODEM ADAPTERS

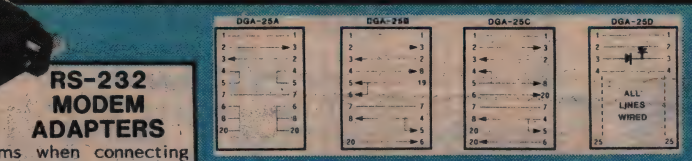
Eliminate need for modems when connecting local terminals or terminal to computer. Construction is the same as our DG Series. Pin connections are shown in the code diagrams. If our standard won't do, we will configure to your specifications.

MODEL	DESCRIPTION	1-9	10-24	25
DGA-25A	Null Modem	16.95	15.42	13.65
DGA-25B	Null Modem	16.95	15.42	13.65
DGA-25C	Null Modem	16.95	15.42	13.65
DGA-25D	Polarity Changer	16.95	15.42	13.65

RS-232 GENDER CHANGERS

Needed when RS-232 cables won't mate. Our DG Series are compact and feature trouble free PC Board construction and lower cost. Choice of shielded or unshielded. Keep some for emergency needs.

MODEL	GENDER	1-9	10-24	25
DG-25F	(F-F)Unshielded	16.95	15.42	13.56
DG-25M	(M-M)Unshielded	16.95	15.42	13.56
DGS-25F	(F-F)Shielded	18.65	16.97	14.92
DGS-25M	(M-M)Shielded	18.65	16.97	14.92



RS-232 DATA LINE MONITOR

A miniature Data Line Monitor allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through, and dedicated Red LED's report the status of:

Transmit Data (TD) pin 2
Receive Data (RC) pin 3
Request To Send (RTS) pin 4
Clear To Send (CTS) pin 5
Data Set Ready (DSR) pin 6
Data Carrier Detect (DCD) pin 8
Data Terminal Ready (DTR) pin 20

LED's glow at 3V & draw only 3 MA at 12V

MODEL	DESCRIPTION	1-9	10-24	25
DLM	Data Line Monitor	37.35	33.99	29.88

RS-232 SIGNAL CHANGER

A unique Switch Box that allows any I/O combinations

When re-configuring terminal or modems, wiring must be altered to handle I/O signals. These changes could be frustrating. An RS-10 can do it easily, simply move the dip switches to open, close or even crossover lines. Supplied with 12 ft. cable with RS-232 Male terminations.

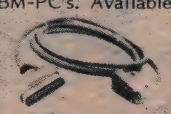
RS-10.....99.00 2 or more.....88.00

Qualified Dealers **WANTED** Call Mark Tomkins for Details

IBM-PC PRINTER CABLE

Molded RS-232 to Centronics. This popular cable mates IBM-PC's. Available in two lengths.

IBM-PC T.M.



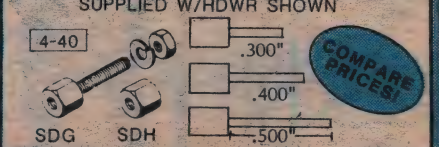
MODEL	FT	1-9	10-24	25
CMX6-IBM	6	39.95	36.35	34.36
CMX12-IBM	12	44.95	40.90	38.66

CUSTOM CABLES On Special Order

PIN	OUT
1	1
14	14
15	32
16	31
17	36
18	33
19	19
20	21
21	23
22	25
23	27
24	29
25	30

RS-232 LOCK-DOWN SCREWS

SUPPLIED W/HDWR SHOWN



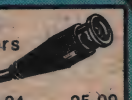
SDG SDH

MODEL-Size	50-450	500-1200	1200-over
SDG-300	.18	.17	.16
SDG-400	.19	.18	.17
SDG-500	.20	.19	.18
SDH	.11	.10	.09

NOTICE: Multiples of 50 Only

COAXIAL CABLES

W/Molded **BNC** Connectors On Each End



MODEL-ft.	1-9	10-24	25-99
RG58C/U - for Instrumentation Use			
CC58C-1	3.55	3.23	3.05
CC58C-2.5	4.10	3.73	3.53
CC58C-5	4.65	4.23	4.00
CC58C-10	6.05	5.51	5.20
CC58C-15	7.45	6.78	6.41
CC58C-25	10.25	9.33	8.82
CC58C-50	17.25	15.70	14.84
CC58C-100	31.25	28.44	26.88
RG59B/U - for Video & General Use			
CC59B-1	3.65	3.32	3.14
CC59B-2.5	4.00	3.64	3.44
CC59B-5	4.75	4.32	4.09
CC59B-10	6.25	5.69	5.38
CC59B-15	7.75	7.05	6.67
CC59B-25	10.75	9.78	9.25
CC59B-50	18.25	16.61	15.70
CC59B-100	33.25	30.26	28.60
RG62A/U - for Computer Applications			
CC62A-1	3.60	3.28	3.10
CC62A-2.5	3.95	3.59	3.40
CC62A-5	4.70	4.28	4.04
CC62A-10	6.15	5.60	5.29
CC62A-15	7.60	6.92	6.54
CC62A-25	10.50	9.56	9.03
CC62A-50	17.75	16.15	15.27
CC62A-100	32.25	29.35	27.74
RG174U - for General Use			
CC174-1	3.60	3.28	3.10
CC174-1.5	3.75	3.41	3.23
CC174-2	3.90	3.55	3.35
CC174-2.5	4.05	3.69	3.48
CC174-4	4.50	4.10	3.87
CC174-5	4.80	4.37	4.13
CC174-10	6.35	5.78	5.46
CC174-15	7.90	7.19	6.79
CC174-25	11.00	10.01	9.46
CC174-30	12.55	11.42	10.79

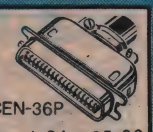
PARALLEL (Centronics) GENDER CHANGERS

Mates Centronics parallel printer cables that are of the wrong sex. All 36 pins are wired through. Bright metal construction. Mating Centronics cables are shown below.

MODEL	GENDER	1-9	10-24	25
DGS-36F	Female-Female	36.95	33.62	29.56
DGS-36M	Male-Male	36.95	33.62	29.56

IF YOU DON'T SEE IT We probably have it in stock or we could make it for you.

CENTRONIC SOLDER-POT CONNECTORS

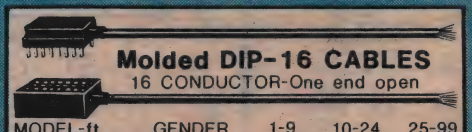


CEN-36P

MODEL	Use With	1-24	25-99
CEN-36PC	Rnd Cable	7.95	7.00
CEN-36PF	Flat Cable	7.95	7.00
CEN-36PN	Panel Mt	6.95	6.12
CEN-36SC	Rnd Cable	8.95	7.88
CEN-36SF	Flat Cable	8.95	7.88
CEN-36SN	Panel Mt	7.95	7.00

Molded DIP-16 CABLES

16 CONDUCTOR-One end open



MODEL-ft.	GENDER	1-9	10-24	25-99
ML16P-1	Male	3.95	3.59	3.40
ML16P-2	Male	4.25	3.87	3.66
ML16P-3	Male	4.55	4.14	3.91
ML16S-1	Female	3.95	3.59	3.40
ML16S-2	Female	4.25	3.87	3.66
ML16S-3	Female	4.55	4.14	3.91

RG59B/U COAXIAL CABLES

W/MOLDED **TNC** CONNECTORS on Each End

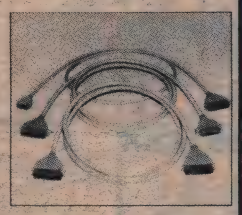
MODEL-ft.	1-9	10-24	25-99
CC59BT-2.5	5.75	5.23	4.95
CC59BT-5	6.50	5.92	5.59
CC59BT-10	8.00	7.28	6.88
CC59BT-15	9.50	8.65	8.17
CC59BT-25	12.50	11.38	10.75
CC59BT-50	20.00	18.20	17.20

CUSTOM COMPUTER CABLES — Made To Order —

FULLY SHIELDED & MOLDED RS-232 COMPUTER CABLES

Features:

1. Excellent mechanical durability
2. UL recognized cables
3. Metal shell connector insert
4. Satisfies requirement for EMI/RFI shielding
5. Fully populated with 25 conductors



MODEL-ft.	1-9	10-24
CSM25-2.5	38.50	35.04
CSM25-5	40.50	36.86
CSM25-10	44.50	40.50
CSM25-15	48.50	44.14
CSM25-25	56.50	51.42
CSM25-50	76.50	69.62

SPECIFY GENDER: Male - Male; Male - Female

We also stock CSM Series in 9, 15, & 37 pin

CENTRONIC CABLES

FULLY **SHIELDED** - 36 CONDUCTORS

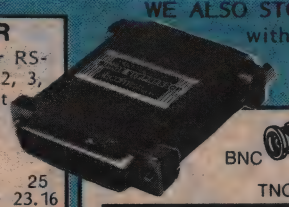
MODEL-ft.	1-4	5-9	10-24
CE36-5	30.50	29.28	27.76
CE36-7.5	34.25	32.88	31.17
CE36-10	37.50	36.00	34.13
CE36-15	44.00	42.24	40.04
CE36-25	57.50	55.20	52.33

NOTICE: **Specify Gender** M-M or M-F Cable with 2 CEN-36 ends

RS-232 SURGE PROTECTOR

Guard against voltage spikes entering your RS-232 ports. Metal-Oxide varistors on lines 2, 3, and 7 clamp surges above 26 volts without affecting normal operation. This compact adapter mounts permanently in series, all 25 lines are wired through.

MODEL	DESCRIPTION	1-9	10-24	25
DSP	Surge Protector	28.95	26.34	23.16



WE ALSO STOCK BNC CABLES with
- Spade Lugs
- Female BNC
- Alligator Clips

WANG TYPE DUAL-RG59B/U

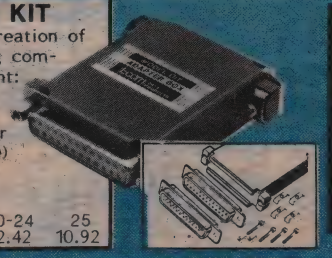
W/MOLDED **BNC** & **TNC** on Each End

MODEL-ft.	1-9	10-24	25-99
CC59WT-2.5	9.85	8.96	8.47
CC59WT-5	11.35	10.33	9.76
CC59WT-10	14.35	13.06	12.34
CC59WT-15	17.35	15.79	14.92
CC59WT-25	23.35	21.25	20.08
CC59WT-50	38.35	34.90	32.98

RS-232 DO IT YOURSELF KIT

This Do It Yourself Kit allows the creation of many RS-232 variations. The following components are included in the assortment:

1ea. Male 25 pin D-Sub Connector
1ea. Female 25 pin D-Sub Connector
2ea. Snap-on half covers (UL 94 VO)
1 set Hardware for Male & Female Connectors

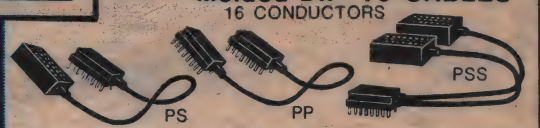


MODEL	DESCRIPTION	1-9	10-24	25
DIY	Do It Yourself Kit	13.65	12.42	10.92

☐ FREE Catalog

Molded DIP-16 CABLES

16 CONDUCTORS



MODEL-ft.	GENDER	1-9	10-24	25-99
ML16PP-1	M-M	6.85	6.23	5.89
ML16PP-2	M-M	7.15	6.51	6.15
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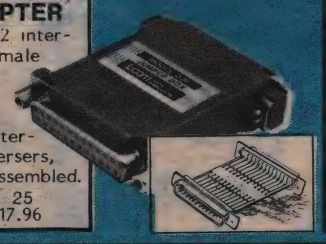

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One-Chip Control

Continued from page 81

tion of the NE9934 address decoder.

Each of the eight output lines of the NE5090 can sink up to 150 mA at 28 volts on its open collector, while the NE590/591 can handle up to 250 mA, but at 5 volts. External power supplies are needed for the outputs.

Operation of the NE5090 is as follows:

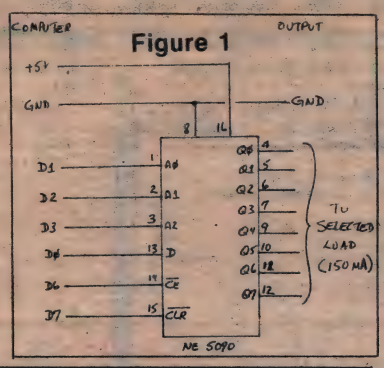
Inputs A0, A1, and A2 are available on computer data lines D1, D2, and D3. They form a 3-bit address line that defines which of the eight outputs (Q0 through Q7) is to receive data.

The binary number of these three input bits identifies *which* Q-output is selected. Thus,

000 = Q0	100 = Q4
001 = Q1	101 = Q5
010 = Q2	110 = Q6
011 = Q3	111 = Q7

Input D—from computer data line D0—is the data input. When the IC is enabled,

Figure 1



this data bit is transferred to the defined output so that a logic-1 turns the output "on," while a logic-0 turns the output "off."

When the chip enable (CE)—from data line D6—is low, the output latches will accept data. When CE goes high, all outputs will retain their existing states, regardless of address or data input conditions.

When the chip clear (CLR) from data line D7 is low, all outputs are turned off. A high data input will override the clear (CLR) function on the addressed latch. Thus, when CLR is low and CE is high, the chip is cleared.

There are two operating modes within this particular family of chips. One mode is momentary where data input drives the associated output stage only while the data signal is present. The other mode is where the output is latched ON or OFF until reset.

I elected to use the latter route as I wanted to make the controller much more useful by leaving the selected outputs ON or OFF until re-triggered at some later time. For details on the other operational modes, interested readers should consult the NE5090 (or NE590/591) Specification and Application sheets available from a Signetics dealer.

Since each Q output of the 5090 allows a current of 150 mA at 28-volts dc, while the 590/591 allows 250 mA (but at only 5-volts), many different devices can be driven.

For example, a relay coil, a low-wattage lamp, a LED (with current-limiting resistor), a power transistor, or some type of audible alarm may be used.

If desired, any output can be used to drive an SCR or TRIAC for high-power ac needs; however, BE WARNED THAT CONTROLLING AN AC CIRCUIT MEANS THAT EITHER AN ISOLATING TRANSFORMER IS USED, OR THE SELECTED IC OUTPUT LINE IS COUPLED TO THE SCR OR TRIAC THROUGH AN OPTO-ISOLATOR. FAILURE TO HEED THIS WARNING MAY RESULT IN CATASTROPHIC DAMAGE TO THE COMPUTER—AND POSSIBLY THE USER!

The hardware is simple. All you need is some kind of physical support for the socket holding the selected controller IC, and a suitable cable and connector to interface the chip to the computer data lines—available at a parallel port. Don't forget the +5 volts and ground lines.

The actual output configuration is left up to the builder since he is the only one that knows what he wants to control. The output circuit should have its own dc power source that should be within the selected devices specified voltage and current limits. Note that a common ground is used for the output lines and chip ground.

The chip is controlled by the decimal or hex values that are output to the parallel port data lines using the values shown in table 1. This table shows the values required to turn any or all of the Q0 through Q7 output lines on or off.

---- Computer Data Lines ----

D7	D6	D5-D4	D3	D2	D1	D0	output		decimal	hex
1	0	x x	0	0	0	0	off	Q0	128	80
1	0	x x	0	0	0	1	on		129	81
1	0	x x	0	0	1	0	off	Q1	130	82
1	0	x x	0	0	1	1	on		131	83
1	0	x x	0	1	0	0	off	Q2	132	84
1	0	x x	0	1	0	1	on		133	85
1	0	x x	0	1	1	0	off	Q3	134	86
1	0	x x	0	1	1	1	on		135	87
1	0	x x	1	0	0	0	off	Q4	136	88
1	0	x x	1	0	0	1	on		137	89
1	0	x x	1	0	1	0	off	Q5	138	8A
1	0	x x	1	0	1	1	on		139	8B
1	0	x x	1	1	0	0	off	Q6	140	8C
1	0	x x	1	1	0	1	on		141	8D
1	0	x x	1	1	1	0	off	Q77	142	8E
1	0	x x	1	1	1	1	on		143	8F

Table 1

Note that in the operating mode we selected, the binary equivalents of both decimal and hex numbers ensure that there will always be a high on data line D7 and a low on data line D6.

For example, if you want to turn Q3 ON, then you would have to output decimal 135 or hex 87 to the port used. If you wanted to turn Q3 OFF, then you would have to output decimal 134 or hex 86.

The user would have to write a BASIC program to output the desired decimal or hex number to the parallel port as

Continued on page 85

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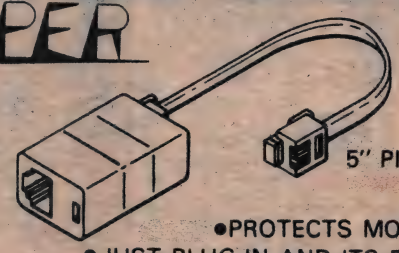

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One-Chip Control
Continued from page 84

required. (POKE, OUT, LPRINT are some BASIC statements that might work. Check your manual.)

If your system has a real-time clock (RTC), you can turn one or more outputs on or off at any desired time. If your system does not have an RTC, a FOR-NEXT loop (in BASIC) can be used to count to some time period before issuing a control signal. As long as you know what binary data should appear on the data lines to switch a particular output ON or OFF, you have it made.

Since in this selected operating mode, D7 is always high, and D6 is always low, these two inputs can be hard wired to the +5 volts and ground respectively. This allows the addressable relay driver to be used in conjunction with a conventional 3-bit counter and clock oscillator to create an electronic "cycling" device whose eight outputs can be used to control almost anything electronic. A computer is not required for this mode of operation and the system may be battery powered. ●

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For more information write 1150 First Avenue, King of Prussia, PA 19406. ●

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John G. Kemeny Receives Academy Of Sciences Award

Dr. John G. Kemeny, Professor of Mathematics and President Emeritus of Dartmouth College, was the recipient of the New York Academy of Sciences Award at the Academy's 167th Annual Meeting held on December 12th at the Vista International Hotel. Dr. Craig Burrell, President of the Academy, presented a certificate of citation and $1,500 to Dr. Kemeny for his brilliant contributions to the computer sciences and to the mathematical aspects of the social sciences.

Dr Kemeny's prodigious contributions to mathematics include the development of novel mathematical curricular materials which resulted in the publication of his book, **Introduction to Finite Mathematics** (co-authored with Thompson and Snell), which has been used by hundreds of thousands of students, his application of mathematical models for the social sciences, his creation (with Thomas Kurtz) of the fabulously successful computer language BASIC, his pioneering development of time sharing in computers, and his chairmanship of the commission (often called the Kemeny Commission) to investigate the accident at Three Mile Island.

In 1949, at the age of 23, Dr. Kemedy received his Ph.D. in mathematics from Princeton University and from 1948 to 1949, he was a research assistant to Dr. Albert Einstein at the Institute for Advanced Study. He has been associated with Dartmouth College since 1953. From 1953-70 he was a Professor of Mathematics, from 1955-67 he was Chairman of Mathematics Department, from 1970-81 he served as the President of Dartmouth College, and in 1981, after his stewardship as President of the College, he resumed his duties as a Professor of Mathematics.

Author of 13 books, many articles in professional journals, contributor to **Encyclopedia Britannica**, Associate Editor of the **Journal of Mathematical Analysis and Applications** (1959-70), and on the Editorial Board of **Abacus** (1983--), Dr. Kemeny has influenced his peers as well as the future generation. He has received 13 honorary degrees (the first before age 40) including LL.D.'s from Princeton and Columbia Universities in 1971 and the Sc.D. from the University of Pennsylvania in 1975. He was a Trustee for the Foundation Center (1970-76), and the Carnegie Foundation for the Advancement of Teaching (1972-78), and was a Director of the Council for Financial Aid to Education (1976-79) and Honeywell, Inc. (1978-79).

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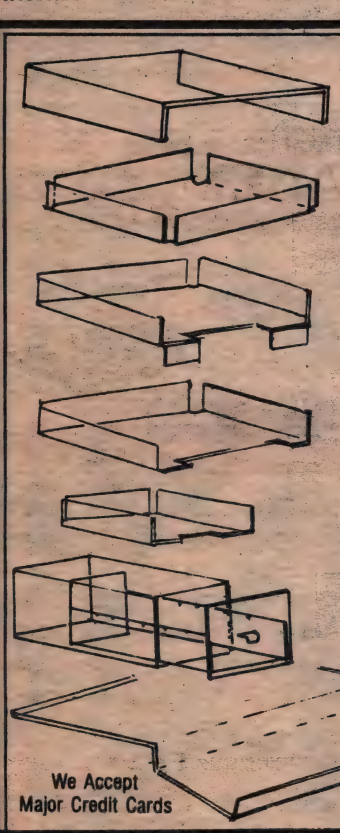

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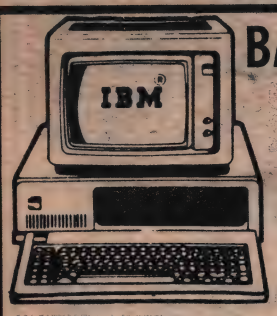

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COMMODORE

Inside The VIC/C-64

The KERNAL Cures Headaches!

by Ted Drude

Sometimes, file handling from machine language programs can be a challenge akin to building an airplane with tweezers. It can be done, but it's quite tedious! Fortunately, Commodore gave us the KERNAL to help deal with the problem. It simplifies the job greatly. This month, we'll see how to OPEN an I/O file from the KERNAL.

Once OPEN, we can PRINT to it (if it's an output), GET from it (if it's an input), and when we're done, CLOSE it. You may already be familiar with how this is done in BASIC. Now you'll see how it's done from Assembly Language using the KERNAL. Hopefully, this will help you appreciate the power of the KERNAL file system, and enable you to use it in your own programs.

Some Books To Consider...

I want to mention two new books, and a couple of older ones, that are must have for serious VIC/64 ML programmers:

The first one is **Machine Language For The Commodore 64 and other Commodore Computers** by Jim Butterfield (Brady Books, Div. of Prentice-Hall, order from B. Dalton, Waldens, etc.). I don't know of any single person in the world who has more technical knowledge about Commodore computers than Jim. He's been hacking with Commodore since their first machine: the MOS KIM I. Everyone who has followed Jim's columns in **COMPUTE!** and **Transactor** has been anxiously waiting for him to write a book on Machine Language programming. Well, it's finally done! Jim has done an excellent job of providing the secrets needed to unlock the mysteries of programming Commodores in ML. His chapter on "linking BASIC and Machine Language" is the most extensive treatise I've ever seen on the subject. I've learned quite a lot from reading it!

He centers mainly on the 64 and VIC, but there is enough information to apply to just about any model. He includes memory maps for almost every Commodore ever built, including the B-128 and the "Plus/4." It's perfect for the beginning to intermediate ML programmer. Even veteran "bit-twiddlers" will be able to pick up a trick or two from the text. I put it in the same overall class as the classic **Programming the PET/CBM** by Raeto Colin West (alas, out of print), but with a smaller scope. By the way, West's book, in my opinion, is the standard technical reference manual for Commodore products. (**COMPUTE!** is planning an updated version called **Programming the VIC-20** that should be helpful for VIC/64 programmers.)

To my knowledge, there is no manual available anywhere that provides the information found in **Inside Commodore DOS** by Richard Immers and Gerald G. Neufeld (available from Reston Publishing, Div. Prentice-Hall, or local bookstore). The depth and detail of this book is enhanced by its superb clarity and readability. I don't believe Commodore itself could have produced a manual this good, even if it wanted to. Drs. Immer and Neufeld have plumbed the depths of the 1541's operating system (DOS) and now the secrets are open to the world. The amazing thing is, they did this without any help whatsoever from Commodore. Most of what they present is the result of an independent analysis of the 1541's DOS ROM. Serious Commodore programmer's everywhere owe the authors a debt of gratitude for doing the hard work of reconstructing the DOS and then, further, making it understandable to the average programmer.

You do not have to be a machine language programmer to use the book. All of the example programs are written in BASIC. The ML programmer, however, will have special appreciation for the commented DOS ROM disassembly in Appendix B of the book. In addition, the authors describe the various disk protection schemes used in Commodore drives today, and how they work on a technical level. This, alone, insures the commercial success of the book. But, the outstanding tutorial nature of the entire publication makes it an essential guide for

Continued on page 88

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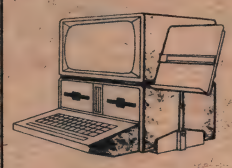

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Inside VIC/C-64

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anyone who desires to know about Commodore DOS in general and the 1541 (or 1540), in particluar.

A rumor that has been circulating is that Richard Immer originally wrote the manuscript of the book as part of his Doctoral Thesis in Computer Science. This might explain the careful attention to detail in the text. Another rumor is that Dr. Immer has not received a single penny in royalties for the book, even though it has sold close to a million copies! If that is true, it is sad, because it is destined to become a classic among Commodore reference texts for some time to come.

A companion volume that complements Immer and Neufeld's book perfectly is the **1541 Single Floppy Drive Maintenance Manual** by Michael G. Peltier. Peltier has done the equally outstanding job of analyzing the 1541, only this time from the hardware perspective. His manual is superbly illustrated and richly detailed. I have seen Commodore's own service manuals for their disk drives. Peltier's book stands head and shoulders above them!

The 198-page service manual rivals any documentation I've ever seen for microcomputer hardware and must have been a "labor of love" to have been done so well.

A smaller condensation of the manual is now available at a very reasonable price. In it, Peltier describes the disk drive alignment procedure for the 1541 and tells how an average "non-technical" person can do the job. In addition, he is marketing an alignment disk that makes it possible to do the procedure without any expensive test equipment. Both the book and the disk together are only $25.90. With the price of a disk alignment running $50 up, you can save yourself quite a bit in repair costs alone. (Available from Peltier Industries, 735 N. Doris, Wichita, KS 67212.)

With all of the shallow and frothy 64-oriented books glutting the market, it is nice to know there are several useful texts filtering through to us. Let's hope it keeps up!

More Rumors From Commodore...

I must comment on the latest rumors concerning Commodore itself. By now you probably know all about the Commodore/Amiga merger. Through their acquisition of the Amiga computer company, Commodore promises a color "Macintosh-like" computer for under $1000! Supposedly, it will be on the market in early '85. If it makes it, it would be an exciting machine at a reasonable price. Atari promises a competing machine available in a similar time frame. We shall see...

The latest rumors about Commodore, however, have nothing to do with the Amiga system. These rumors are about the possibility of a "new" C-128 machine being released. The C-128, for those of you who do not know, was originally designated the "P-128" and was announced in 1981. Although not totally compatible with the 64, it was to have the C-64 SID and VIC II chips with 128K of RAM, expandable to 890K or so. Parallel disk drives were available through the built-in IEEE interfaces. It used a 6509 microprocessor at 2 MHZ, and was to have optional 8088 and Z-80 co-processors to run CP/M and CP/M-86. Needless to say, it was never produced. After two years of postponement, it appeared the project was canceled.

Announced at the same time, the B-128/BX-256 business computer versions were produced, but in limited quantity. These machines did not have the VIC II chip, but did have the SID chip, so they are sound compatible with the 64. For a 64 owner who wants to upgrade, the B-128 offers little incentive. A good machine in its own right, it has no hardware or software compatibility with the 64. Any investment in software or peripherals is "lost." Both machines had better success overseas and most of the software that is available for them is of foreign origin (and some of it is quite good!)

Now, it appears, Commodore is thinking seriously about re-introducing the C-128. This time, however, there will be some differences. First, every attempt will be made to keep the machine software compatible with the 64. Second, the system will still come with 128K RAM, more optional. Third, it will have a built-in 40 and 80-column color display. Other features are IEEE or parallel bus for faster disk drives, serial peripheral compatibility with the VIC/64, possible built-in software (ala the "Plus/4"), for a $500-800 price. It would probably be packaged in the same housing used for the B-128. That machine has one of the nicest keyboards I've ever seen on a computer. If Commodore really does get serious about this machine, they can count me in! It's what I am looking for in a replacement to my 64!

This machine would be a natural successor to the 64. If the 2 million + VIC/64 owners knew they weren't losing their investment in software and peripherals, they would flock to this new machine like bears to honey! New buyers would know that they could access a huge software base that is growing every day. (This may be the only thing that keeps Apple II's selling like hotcakes.)

If this rumor proves true and Commodore markets this thing, I think you can effectively kiss machines like the PCjr and the Adam goodbye. If Commodore doesn't introduce the machine soon but waits like they did before, they will be counting on the "Plus/4" (ho-hum), The Amiga (?), and an aging "64" to carry the company. In the meantime, a lot of VIC/64 owners will be outgrowing their machines and in the market for a newer, more powerful system. Atari knows this and is already promising to deliver upgraded versions of 800XL soon. The time is ripe for another "coup" from Commodore. Let's hope the rumor becomes reality!

By the way, I think that Commodore, if it plays its markets right, will have very little competition in the "low end" for the next few months. I expect to see Atari make a

Continued on page 94

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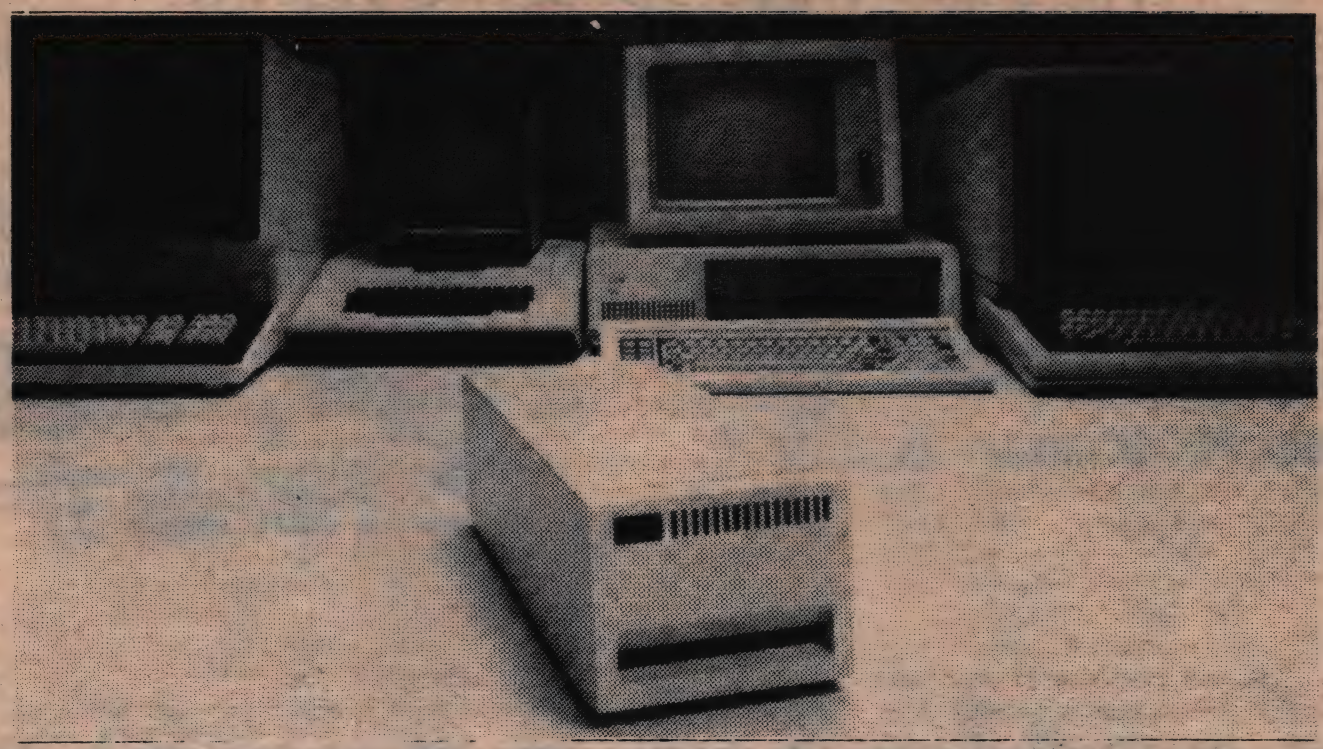

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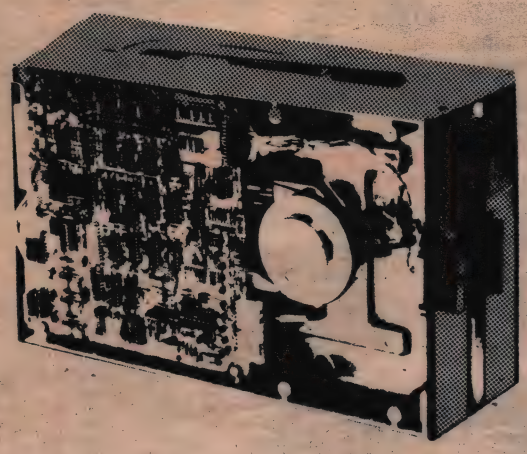

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SN7459N	14	.35
SN7460N	14	.39
SN7470N	14	.39
SN7472N	14	.39
SN7473N	14	.39

Part No.	Pins	Price
SN7474N	14	.39
SN7475N	16	.45
SN7476N	16	.39
SN7479N	14	4.95
SN7480N	14	.89
SN7482N	14	1.49
SN7483N	16	.55
SN7485N	16	.59
SN7486N	14	.39
SN7489N	16	2.25
SN7490N	14	.49
SN7491N	14	.79
SN7492N	14	.45
SN7493N	14	.45
SN7494N	14	.89
SN7495N	14	.49
SN7496N	16	.49
SN7497N	16	3.25
SN74100N	24	1.95
SN74105N	14	1.19
SN74107N	14	.29
SN74109N	16	.39
SN74116N	24	1.49
SN74121N	14	.45
SN74122N	14	.69
SN74123N	16	.55
SN74125N	14	.49
SN74126N	14	.49
SN74128N	14	.79
SN74132N	14	.59
SN74136N	14	.69
SN74141N	16	.89
SN74142N	16	3.95
SN74143N	24	3.95
SN74144N	24	3.95
SN74145N	16	.65
SN74147N	16	1.29
SN74148N	16	.89
SN74150N	24	1.49
SN74151N	16	.49
SN74152N	14	.49
SN74153N	16	.99
SN74154N	24	1.49
SN74155N	16	.49
SN74156N	16	.59
SN74157N	16	.49

Part No.	Pins	Price
SN74159N	24	1.95
SN74160N	16	.59
SN74161N	16	.59
SN74162N	16	.59
SN74163N	16	.59
SN74164N	14	.69
SN74165N	16	.69
SN74166N	16	.69
SN74167N	16	2.95
SN74170N	16	1.59
SN74172N	24	4.95
SN74173N	16	.85
SN74174N	16	.59
SN74175N	16	.59
SN74176N	14	.79
SN74177N	14	.79
SN74179N	16	1.49
SN74180N	14	.69
SN74181N	24	1.95
SN74182N	16	1.05
SN74184N	16	2.29
SN74185N	16	2.29
SN74190N	16	.69
SN74191N	16	.69
SN74192N	16	.69
SN74193N	16	.69
SN74194N	16	.69
SN74195N	16	.49
SN74196N	14	.75
SN74197N	14	.75
SN74198N	24	1.19
SN74199N	24	1.19
SN74221N	16	1.19
SN74251N	16	.79
SN74273N	20	1.95
SN74276N	20	2.49
SN74279N	16	.79
SN74283N	16	1.39
SN74284N	16	2.95
SN74285N	16	2.95
SN74365N	16	.55
SN74366N	16	.55
SN74367N	16	.55
SN74368N	16	.55
SN74390N	16	1.49
SN74393N	14	1.49

74LS

74LS00	14	.29
74LS01	14	.29
74LS02	14	.35
74LS03	14	.29
74LS04	14	.39
74LS05	14	.35
74LS08	14	.35
74LS09	14	.35
74LS10	14	.35
74LS11	14	.35
74LS14	14	.59
74LS15	14	.35
74LS20	14	.29
74LS21	14	.35
74LS26	14	.29
74LS27	14	.35
74LS28	14	.39
74LS30	14	.39
74LS32	14	.39
74LS37	14	.35
74LS38	14	.39
74LS42	16	.49
74LS47	16	.89
74LS51	14	.29
74LS73	14	.39
74LS74	14	.49
74LS75	16	.45
74LS76	16	.39
74LS85	16	.89
74LS86	14	.39
74LS90	14	.55
74LS92	14	.55
74LS93	14	.59
74LS96	16	.89
74LS107	14	.39
74LS109	16	.39
74LS112	16	.45
74LS114	14	.39
74LS122	14	.49
74LS123	16	.79
74LS125	14	.59
74LS126	14	.59

74LS132	14	.65
74LS133	16	.59
74LS136	14	.39
74LS138	16	.59
74LS139	16	.59
74LS145	16	1.19
74LS147	16	1.95
74LS148	16	1.79
74LS151	16	.59
74LS153	16	.59
74LS154	24	1.49
74LS155	16	.69
74LS156	16	.69
74LS157	16	.69
74LS158	16	.59
74LS160	16	.69
74LS161	16	.69
74LS162	16	.69
74LS163	16	.69
74LS164	14	.89
74LS165	16	.89
74LS168	16	1.19
74LS169	16	1.49
74LS170	16	1.49
74LS173	16	.69
74LS174	16	.69
74LS175	16	.69
74LS181	24	2.49
74LS190	16	.79
74LS191	16	.89
74LS192	16	.79
74LS193	16	.89
74LS194	16	.69
74LS195	16	.59
74LS196	14	.89
74LS197	14	.89
74LS221	16	1.09
74LS240	20	1.09
74LS241	20	.99
74LS243	14	1.09

74LS244	20	1.29
74LS245	20	1.49
74LS251	16	.59
74LS253	16	.59
74LS257	16	.59
74LS258	16	.59
74LS260	14	.59
74LS266	14	.49
74LS273	20	1.49
74LS279	16	.49
74LS280	14	1.95
74LS299	20	2.95
74LS322	20	3.95
74LS323	20	3.95
74LS347	16	.79
74LS353	16	1.09
74LS364	20	1.95
74LS365	16	.49
74LS366	16	.49
74LS367	16	.49
74LS368	16	.49
74LS373	20	1.49
74LS374	20	1.49
74LS375	16	.69
74LS386	14	.39
74LS393	14	1.19
74LS399	16	1.49
74LS490	16	1.95
74LS533	20	1.95
74LS534	20	1.95
74LS540	20	1.49
74LS541	20	1.49
74LS640	20	2.19
74LS641	20	2.19
74LS644	20	2.19
74LS645	20	2.19
74LS670	16	1.49
74LS688	20	2.95
81LS95	20	1.49
81LS96	20	1.49
81LS97	20	1.49
81LS98	20	1.49

74S/PROMS*

74S00	14	.35
74S02	14	.35
74S03	14	.35
74S04	14	.45
74S05	14	.45
74S08	14	.45
74S09	14	.39
74S10	14	.35
74S11	14	.35
74S15	14	.35
74S20	14	.35
74S22	14	.35
74S30	14	.35
74S32	14	.45
74S37	14	.99
74S38	14	.89
74S51	14	.35
74S64	14	.39
74S65	14	.39
74S74	14	.55
74S85	16	1.99
74S86	14	.55
74S112	16	.55
74S113	14	.55

74S114	14	.55
74S124	16	2.75
74S132	14	1.89
74S133	16	.45
74S135	16	.89
74S136	14	1.39
74S138	16	.89
74S139	16	.89
74S140	14	.69
74S151	16	.99
74S153	16	.99
74S157	16	.99
74S158	16	.99
74S160	16	2.29
74S169	16	4.29
74S174	16	1.09
74S175	16	1.09
74S188*	16	1.75
74S194	16	1.49
74S195	16	1.49
74S196	14	1.49
74S240	20	1.95

74S241	20	1.95
74S242	14	2.19
74S243	14	2.19
74S244	20	2.19
74S251	16	.99
74S253	16	.99
74S257	16	.99
74S258	16	.99
74S260	14	.79
74S273	20	2.39
74S280	14	1.89
74S287*	16	1.79
74S288*	16	1.79
74S299	20	5.95
74S373	20	2.49
74S374	20	2.49
74S387*	16	1.95
74S471*	20	4.95
74S472*	20	4.95
74S473*	20	4.95
74S570*	16	2.95
74S571*	16	2.95
74S572*	18	4.95
74S573*	18	4.95

CA—LINEAR

CA3010H		1.09
CA3039H		1.25
CA3046N	14	.99
CA3059N	14	2.95
CA3060N	16	2.95
CA3065E	14	1.49
CA3080E	8	.99

CA3081N	16	1.15
CA3082N	16	1.15
CA3083N	16	1.15
CA3086N	14	.85
CA3089N	16	1.95
CA3096N	16	1.75

CA3130E	8	1.19
CA3140E	8	.85
CA3160H		1.79
CA3160E	8	1.49
CA3161E	16	1.79
CA3162E	16	6.95
CA3189E	16	2.79
CA3401N	14	.59

CD—CMOS

CD4001	14	.29
CD4002	14	.29
CD4006	14	.89
CD4007	14	.29
CD4008	16	.89
CD4009	16	.59
CD4010	16	.49
CD4011	14	.29
CD4012	14	.29
CD4013	14	.39
CD4014	16	.89
CD4015	16	.39
CD4016	14	.49
CD4017	16	.79
CD4018	16	.79
CD4019	16	.49
CD4020	16	.75
CD4021	16	.75
CD4022	16	.75
CD4023	14	.29
CD4024	14	.69
CD4025	14	.29
CD4026	16	1.59
CD4027	16	.45
CD4028	16	.69
CD4029	16	.79
CD4030	14	.39
CD4034	24	1.79
CD4035	16	.79
CD4040	16	.75

(More in Catalog)

CD4041	14	.69
CD4042	16	.69
CD4043	16	.79
CD4044	16	.79
CD4046	16	.89
CD4047	14	.89
CD4048	16	.59
CD4049	16	.39
CD4050	16	.39
CD4051	16	.79
CD4052	16	.89
CD4053	16	.79
CD4056	16	2.95
CD4059	24	3.95
CD4060	16	.89
CD4066	14	.45
CD4068	14	.39
CD4069	14	.35
CD4070	14	.29
CD4071	14	.29
CD4072	14	.29
CD4073	14	.29
CD4077	14	.35
CD4078	14	.49
CD4081	14	.29
CD4093	14	.49
CD4094	16	1.95
CD4098	16	1.95
CD4099	16	1.89

CD4503	16	.69
CD4506	16	1.29
CD4507	14	1.19
CD4508	24	1.95
CD4510	16	.85
CD4511	16	.85
CD4512	16	.85
CD4514	24	1.49
CD4515	24	1.49
CD4516	16	.89
CD4518	16	.89
CD4519	16	.59
CD4520	16	.89
CD4526	16	1.19
CD4528	16	1.19
CD4529	16	1.69
CD4531	16	.89
CD4538	16	1.49
CD4541	14	1.49
CD4543	16	1.19
CD4562	14	6.95
CD4566	16	2.95
CD4583	16	2.49
CD4584	14	.59
CD4723	16	1.19
CD4724	16	1.19
MC14410	16	8.95
MC14411	24	11.95
MC14412	16	7.95
MC14433	24	17.95
MC14572	16	1.19

74F00 NEW 74ALS00

Part No.	Pins	Function	Price
74F00	14	Quad 2-Input NAND Gate	.69
74F02	14	Quad 2-Input NOR Gate	.75
74F04	14	Hex Inverter	.89
74F08	14	Quad 2-Input AND Gate	.75
74F10	14	Triple 3-Input NAND Gate	.75
74F32	14	Quad 2-Input OR Gate	.79
74F74	14	Dual D Flip-Flop	.85
74F86	14	Quad Exclusive OR Gate	1.15
74F109	16	Dual JK Positive Edge Flip-Flop	.95
74F138	16	Expandable 3/8 Decoder	1.69
74F157	16	Quad 2-Input Multiplexer	1.69
74F158	16	Quad 2-Input Multiplexer (Inv.)	1.69
74F193	16	4-Bit Up/Down Binary Counter	5.29
74F240	20	Tri-State Octal Line Driver (Inverting)	3.75
74F244	20	Tri-State Octal Line Driver	3.49
74F257	16	Tri-State Quad 2-Input Multiplexer	1.79
74F373	20	Tri-State Octal Latch	4.89
74F374	20	Tri-State Octal D Flip-Flop	4.59

Part No.	Pins	Function	Price
74ALS00	14	Quad 2-Input NAND Gate	.59
74ALS02	14	Quad 2-Input NOR Gate	.59
74ALS04	14	Hex Inverter	.59
74ALS08	14	Quad 2-Input AND Gate	.59
74ALS10	14	Triple 3-Input NAND Gate	.59
74ALS30	14	8-Input NAND Gate	.59
74ALS32	14	Quad 2-Input OR Gate	.65
74ALS74	14	Dual D Flip-Flop	.79
74ALS109	16	Dual JK Pos. Edge Flip-Flop	.79
74ALS138	16	Expandable 3/8 Decoder	1.25
74ALS240	20	Tri-State Octal Line Driver (Inverting)	2.25
74ALS244	20	Tri-State Octal Line Driver	2.25
74ALS245	20	Octal Bus Transceiver (Non-Inv.)	2.59
74ALS373	20	Tri-State Octal Latch	2.59
74ALS374	20	Tri-State Octal D Flip-Flop	2.59

MICROPROCESSOR COMPONENTS

MICROPROCESSOR CHIPS

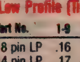
Part No.	Pins	Function	Price
D765AC	40	Floppy Disk Controller	19.95
D3242	28	Addr. Multiplexer & Refresh Counter	7.95
TMS5501	40	Synchronous Data Interface (SIRC)	14.95
Z80, Z80A, Z80B, Z8000 SERIES			
Z80	40	CPU (MK3880N) (780C) 2.5MHz	2.95
Z80-CTC	28	Counter Timer Circuit	3.49
Z80-DART	40	Dual Asynchronous Rec./Trans.	8.95
Z80-DMA	40	Direct Memory Access Circuit	12.49
Z80-P10	40	Parallel I/O Interface Controller	3.49
Z80-S10/0	40	Serial I/O (TxCB and RxCB Bonded)	11.49
Z80-S10/1	40	Serial I/O (Lacks DTRB)	11.49
Z80-S10/2	40	Serial I/O (Lacks SYNCB)	11.49
Z80-S10/9	40	Serial I/O	11.49
Z80A	40	CPU (MK3880N-4) (780C-1) 4MHz	3.49
Z80A-CTC	28	Counter Timer Circuit	4.49
Z80A-DART	40	Dual Asynchronous Rec./Trans.	9.95
Z80A-DMA	40	Direct Memory Access Circuit	12.95
Z80A-P10	40	Parallel I/O Interface Controller	3.95
Z80A-S10/0	40	Serial I/O (TxCB and RxCB Bonded)	11.95
Z80A-S10/1	40	Serial I/O (Lacks DTRB)	11.95
Z80A-S10/2	40	Serial I/O (Lacks SYNCB)	11.95
Z80A-S10/9	40	Serial I/O	11.95
Z80B	40	CPU (MK3880N-6) 6MHz	8.95
Z80B-CTC	28	Counter Timer Circuit	11.95
Z80B-DART	40	Dual Asynchronous Rec./Trans.	19.95
Z80B-P10	40	Parallel I/O Interface Controller	10.95
Z8001B	48	CPU Segmented (10MHz)	79.95
Z8002B	40	CPU Non-Segmented (10MHz)	59.95
6500/6800/68000 SERIES			
6502	40	MPU with Clock (1MHz)	4.95
6502A	40	MPU with Clock (2MHz)	4.95
6502B	40	MPU with Clock (3MHz)	8.95
6520	40	Peripheral Inter. Adapter	3.95
6522	40	Peripheral Inter. Adapter	5.49
6551	28	Async. Comm. Interface Adapter	10.95
6800	40	MPU	2.95
6802CP	40	MPU with Clock and RAM	7.95
6809	40	CPU — 8-Bit (On-Chip Oscillator)	8.95
6809E	40	CPU — 8-Bit (External Clocking)	9.95
68B09E	40	CPU — 8-Bit (Ext. Clocking) 2MHz	14.95
68B10	24	128x8 Static RAM (2MHz)	5.95
6821	40	Peripheral Inter. Adapt. (MC6820)	2.95
68B21	40	Peripheral Interface Adapter (2MHz)	5.95
6845	40	CRT Controller (CRTC)	14.95
68B45	40	CRT Controller (CRTC) 2MHz	19.95
6850	24	Asynchronous Comm. Adapter	3.95
6860	24	0-600bps Digital MODEM	7.95
68000L8	64	MPU 16-Bit (8MHz)	39.95
68488P	40	General Purpose Int. Adapter	9.95
8000/80000 SERIES			
8031	40	Control Oriented CPU w/RAM & I/O	14.95
8035	40	MPU — 8-Bit	5.95
8039	40	CPU—Sgl. Chip 8-Bit (128bts. RAM)	5.95
8040N-6	40	CPU (256 bytes RAM)	9.95
8060	40	CPU — 8-Bit NMOS	14.95
8073N	40	CPU w/Basic Micro Interpreter	29.95
8080A	40	CPU	3.95
8085A	40	CPU	4.95
8085A-2	40	CPU — 8-Bit N-Channel (5MHz)	11.95
8086-2	40	CPU 16-bit 8MHz	24.95
8087	40	Arithmetic Processor	189.95
8088	40	CPU 8/16-Bit	19.95
8155	40	HMOS RAM I/O Port-Timer	6.95
8156	40	RAM with I/O Port and Timer	8.95
8205	16	Hi Speed 1 out of 8 Binary Decoder	3.95
8212	24	8-Bit Input/Output (74S412)	2.95
8224	16	Clock Generator/Driver	2.95
8228	28	System Cont./Bus Driver (74S428)	4.95
8237-5	40	High Perf. Prog. DMA Cont. (5MHz)	19.95
8238	28	System Controller (74S438)	4.95
8243	24	I/O Expander for 48 Series	4.95
8250N	40	Async. Comm. Element	10.95
8251	28	Prog. Comm. I/O (USART)	4.95
8251A	28	Prog. Comm. Interface (USART)	7.95
8253	24	Prog. Interval Timer	6.95
8255	40	Prog. Peripheral I/O (PPI)	4.95
8255A-5	40	Prog. Peripheral I/O (PPI) 5MHz	7.95
8259	28	Prog. Interrupt Control	5.95
8272	40	Sgle/Dble Density Floppy Disk Cont.	19.95
8274	40	Multi-Protocol Serial Cont. (7201)	29.95
8279	40	Prog. Keyboard/Display Interface	6.95
8282	20	Octal Latch	8.95
8284	18	Clock Generator/Driver	6.95
8286	20	Octal Bus Transceiver	7.95
8287	20	Octal Bus. Transceiver (Inverted)	7.95
8288	20	Bus Controller	19.95
8303	20	8-Bit Tri-State Bi-Directional Trans.	3.49
8304	20	8-Bit Bi-Directional Receiver	3.49
8310	20	Octal Latched Peripheral Driver	3.95
8741	40	8-Bit Univ. Peripheral Interface	29.95
8748	40	HMOS EPROM MPU	39.95
8749	40	MPU 8-Bit (EPROM Version of 8049)	39.95
8755	40	16K EPROM with I/O	39.95
80186-6	68	High Integration 16-Bit MPU	99.95
80188	68	High Integra. 16-Bit MPU (8-Bit Data Bus)	89.95
DISK CONTROLLERS			
INS1771-1	40	Single Density	16.95
FD1791	40	Single/Dual Density (Inv.)	24.95
FD1793	40	Single/Double Density (True)	26.95
FD1795	40	Dual Density/Side Select (Inv.)	26.95
FD1797	40	Dual Density/Side Select (True)	29.95
SPECIAL FUNCTION			
DS0026CN	8	Dual MOS Clock Driver (5MHz)	1.95
INS2651	28	Communication Chip	7.95
MC3470P	18	Floppy Disk Read Amp System	4.95
MM5321N	16	TV Camera Sync. Generator	9.95
MM54240N	24	Asynchronous Transmitter/Receiver	5.95
MM58167AN	24	Microprocessor Real Time Clock	8.95
MM58174AN	16	Micro. Compatible Time Clock	8.95
MM5369AA/N	8	Prog. Oscillator/Divider (60Hz)	1.79
MM5369EST	8	Prog. Oscillator/Divider (100Hz)	1.95

DYNAMIC RAMS

Part No.	Pins	Function		Price
1103	18	1024x1	(300ns)	.99
4027	16	4096x1	(250ns)	1.49
4116N-2	16	16,384x1	(150ns)	1.39 — 8/10.95
4116N-3	16	16,384x1	(200ns)	1.15 — 8/8.95
4116N-4	16	16,384x1	(250ns)	.89 — 8/6.95
4164N-150	16	65,536x1	(150ns)	5.19 — 8/40.95
4164N-200	16	65,536x1	(200ns)	4.95 — 8/38.95
MM5261	18	1024x1	(300ns)	.35 — 8/1.95
MM5262	22	2048x1	(365ns)	.35 — 8/1.95
MM5270	18	4096x1	(250ns) MK4096	4.95
MM5280	22	4096x1	(200ns) 2107	3.95
MM5298-3	16	8192x1	(200ns)	.59
41256-150	16	262,144x1	(150ns)	34.95
41256-200	16	262,144x1	(200ns)	31.95
48128	16	131,072x1	(200ns)	24.95
STATIC RAMS				
2101	22	256x4	(450ns) 8101	1.95
2102	16	1024x1	(350ns)	.89
2102-2L	16	1024x1	(250ns) L.P. (91L02)	1.49
2111	18	256x4	(450ns) 8111	2.49
2112	16	256x4	(450ns) MOS	2.49
2114N	18	1024x4	(450ns)	1.29 — 8/9.95
2114N-L	18	1024x4	(450ns) L.P.	1.95 — 8/13.95
2114N-2	18	1024x4	(200ns)	1.39 — 8/10.95
2114N-2L	16	1024x4	(200ns) L.P.	1.69 — 8/13.49
2147HN	18	4096x1	(70ns)	4.49
2148HN	18	1024x4	(70ns)	4.95
TMS4045	18	1024x4	(450ns)	3.95
TMS40L47-45	20	1024x4	(450ns)	1.95
5101	22	256x4	(450ns) CMOS	3.95
MM5257	18	4096x1	(450ns) 4044	4.95
HM6116P-2	24	2048x8	(120ns) CMOS	7.95
HM6116LP-2	24	2048x8	(120ns) L.P. CMOS	8.95
HM6116P-3	24	2048x8	(150ns) CMOS	4.95
HM6116LP-3	24	2048x8	(150ns) L.P. CMOS	6.49
HM6116P-4	24	2048x8	(200ns) CMOS	4.75
HM6116LP-4	24	2048x8	(200ns) L.P. CMOS	5.49
HM6264P-12	28	8192x8	(120ns) CMOS	37.95
HM6264LP-12	28	8192x8	(120ns) L.P. CMOS	39.95
HM6264P-15	28	8192x8	(150ns) CMOS	34.95
HM6264LP-15	28	8192x8	(150ns) L.P. CMOS	37.95
27LS00	16	256x1	(80ns) L.P.	3.95
7489	16	16x4	(50ns) 3101	2.25
74C921	18	256x4	(250ns) CMOS	5.95
74C930	18	1024x1	(250ns) CMOS (6518)	5.95
74S189	16	16x4	(35ns) 93405	2.95
74S289	16	16x4	(35ns) 3101	2.95
82S10	16	1024x1	(50ns) O.C. (93415)	3.95
82S25	16	16x4	(50ns) O.C. (74S289)	2.25
PROMS/EPROMS				
1702A	24	256x8	(1µs)	3.95
2708	24	1024x8	(450ns)	3.95
TMS2516	24	2048x8	(450ns) 2716	4.95
TMS2532	24	4096x8	(450ns) NMC2532	5.49
TMS2564	28	8192x8	(450ns)	10.95
TMS2716	24	2048x8	(450ns) 3 voltage	7.95
2716	24	2048x8	(450ns)	3.95
27C16	24	2048x8	CMOS	14.95
2716-1	24	2048x8	(350ns)	5.49
27160-5	24	2048x8	(550ns)	3.75
2732	24	4096x8	(450ns)	4.95
2732A-20	24	4096x8	(200ns) 21V	11.49
2732A-25	24	4096x8	(250ns) 21V	7.19
2732A-45	24	4096x8	(450ns) 21V	6.49
27C32	24	4096x8	CMOS	19.95
27C32A-30	24	4096x8	(300ns) 21V (CMOS)	22.95
2764-20	28	8192x8	(200ns) 21V	14.95
2764-25	28	8192x8	(250ns) 21V	7.19
2764-45	28	8192x8	(450ns) 21V	6.49
27C64	28	8192x8	CMOS 21V	22.95
MCM68764	24	8192x8	(450ns) 21V	24.95
27128-25	28	16,384x8	(250ns) 128K Eprom 21V	21.95
27256-25	28	32,768x8	(250ns) 256K Eprom (14V)	99.95
74S188	16	32x8	PROM O.C. (6330-1)	1.75
74S287	16	256x4	PROM T.S. (6301-1)	1.79
74S288	16	32x8	PROM T.S. (6331-1)	1.79
74S387	16	256x4	PROM O.C. (6300-1)	1.95
74S471	20	256x8	PROM T.S. (6309-1)	4.95
74S472	20	512x8	PROM T.S. (6349-1)	4.95
74S473	20	512x8	PROM O.C. (6348)	4.95
74S474	24	512x8	PROM T.S. (DM87S296N)	4.95
74S475	24	512x8	PROM O.C. (6340)	4.95
74S476	18	1024x4	PROM T.S.	6.95
74S478	24	1024x8	PROM T.S.	9.95
74S570	16	512x4	PROM O.C. (6305)	2.95
74S571	16	512x4	PROM T.S. (6306)	2.95
74S572	18	1024x4	PROM O.C. (6352)	4.95
74S573	18	1024x4	PROM T.S. (82S137)	4.95
82S23	16	32x8	PROM O.C. (27S18)	2.95
82S115	24	512x8	PROM T.S. (27S15)	9.95
82S123	16	32x8	PROM T.S. (27S19)	2.95
82S126	16	256x4	PROM O.C. (27S20)	2.95
82S129	16	256x4	PROM T.S. (27S21)	2.95
82S130	16	512x4	PROM O.C. (27S12)	3.95
82S185	18	2048x4	PROM T.S. (TBP24S81)	9.95
82S191	24	2048x8	(80ns)	14.95
DM87S181N	24	1024x8	PROM T.S. (82S181)	9.95
DM87S184N	18	2048x4	PROM O.C. (82S184)	9.95
DM87S185N	18	2048x4	PROM T.S. (82S185)	9.95
DM87S191N	24	2048x8	PROM T.S. (82S191)	14.95

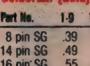
DATA ACQUISITION

Part No.	Pins	Function	Price
DC10		Mostek DC/DC Converter +5V to −9V	2.95
ADC0801	20	8-Bit A/D Converter (1/4LSB)	14.95
ADC0803	20	8-Bit A/D Converter (±1/2LSB)	4.95
ADC0804	20	8-Bit A/D Converter (1LSB)	3.49
ADC0808	28	8-Bit A/D Conv. w/8-Channel Analog	9.95
ADC0809	28	8-Bit A/D Converter (8-Ch. Multi.)	4.49
ADC0816	40	8-Bit A/D Conv. w/16-Channel Analog	14.95
ADC0817	40	8-Bit A/D Converter (16-Ch. Multi.)	9.49
DAC0806	16	8-Bit D/A Converter (0.78% Lin.)	1.95
DAC0807	16	8-Bit D/A Converter (MC1408-7)	1.49
DAC0808	16	8-Bit D/A Converter (MC1408-8)	2.25
DAC0830	20	8-Bit Up D/A Conv. (.05% Lin.)	5.95
DAC0831	20	8-Bit Up D/A Conv. (.10% Lin.)	4.49
DAC1000	24	10-Bit D/A Conv. Micro. Comp. (0.05%)	7.95
DAC1008	20	10-Bit D/A Conv. Micro. Comp. (0.20%)	6.95
DAC1020	16	10-Bit D/A Conv. (0.05% Lin.)	7.95
DAC1022	16	10-Bit D/A Conv. (0.20% lin.)	5.95
DAC1222	18	12-Bit D/A Conv. (0.20% Lin.)	6.95
DAC1230	20	12-Bit Up D/A Conv. (.05% Lin.)	14.95
DAC1231	20	12-Bit Up D/A Conv. (.10% Lin.)	13.95
AY-5-1013A	40	30K Baud UART (TR1602)	3.95



Low Profile (Tin) Sockets

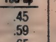
Part No.	1-9	10-99	100-up
8 pin LP	.16	.14	.13
14 pin LP	.17	.15	.14
16 pin LP	.19	.17	.16
18 pin LP	.26	.24	.23
20 pin LP	.30	.27	.25
22 pin LP	.31	.28	.26
24 pin LP	.33	.30	.28
28 pin LP	.40	.37	.35
40 pin LP	.49	.46	.43



Soldertail (Gold) Standard

Part No.	1-9	10-99	100-up
8 pin SG	.39	.35	.29
14 pin SG	.49	.45	.39
16 pin SG	.55	.49	.45
18 pin SG	.65	.59	.51
20 pin SG	.75	.65	.59
22 pin SG	.79	.69	.65
24 pin SG	.79	.69	.65
28 pin SG	.95	.85	.75
36 pin SG	1.25	1.15	.99
40 pin SG	1.39	1.25	1.15

Wire Wrap Sockets (Gold) Level #3



Part No.	1-9	10-99	100-up
8 pin WW	.55	.49	.45
10 pin WW	.69	.65	.59
14 pin WW	.75	.69	.65
16 pin WW	.79	.72	.65
18 pin WW	.95	.85	.75
20 pin WW	1.19	1.09	.95
22 pin WW	1.29	1.19	1.05
24 pin WW	1.35	1.19	1.09
28 pin WW	1.69	1.55	1.39
36 pin WW	1.89	1.79	1.69
40 pin WW	2.29	1.95	1.79

Header Plugs (Gold)

Part No.	1-9	10-99	100-up
14 pin HP	.65	.59	.55
16 pin HP	.69	.65	.59
24 pin HP	1.15	.99	.89

Header Covers

Part No.	1-9	10-99	100-up
14 pin HC	.15	.13	.12
16 pin HC	.19	.17	.15
24 pin HC	.29	.25	.22

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The DT1050 consists of a Speech Processor Chip, MM54104 (40-pin) and two (2) Speech ROMs MM52164SSR1 and MM52164SSR2 (24-pin) along with a Master Word list and a recommended schematic diagram on the application sheet.

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DT1057 - Expands the DT1050 vocabulary from 137 to over 260 words. Includes 2 ROMs and specs.
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INTERSIL

Part No.	Pins	Function	Price
7045IPI	28	CMOS Precision Timer	14.95
7045EV/Kit	28	Stopwatch Chip, XTL (Evaluation Kit)	19.95
7106CPL	40	3½ Digit A/D (LCD Drive)	10.49
FE0202D	40	4 Digit LCD Display for 7106 & 7116	14.95
FE0203D		3½ Digit LCD Display for 7106 & 7116	14.95
7106EV/Kit	40	IC, Circuit Board, Display (Evaluation Kit)	46.95
7107CPL	40	3½ Digit A/D (LED Drive)	10.95
7107EV/Kit	40	IC, Circuit Board, Display (Evaluation Kit)	46.95
7116CPL	40	3½ Digit A/D LCD Dis. HLD	10.95
7201IUS		Low Battery Volt. Indicator	2.25
7205IPG	24	CMOS LED Stopwatch/Timer	14.95
7205EV/Kit	24	Stopwatch Chip, XTL (Evaluation Kit)	16.95
7206CJPE	16	Tone Generator	4.95
7206CEV/Kit	16	Tone Generator Chip, XTL (Evaluation Kit)	7.95
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7207AEV/Kit	14	Freq. Counter Chip, XTL (Evaluation Kit)	8.49
7215IPG	24	4 Func. CMOS Stopwatch CKT	16.95
7215EV/Kit	24	4 Func. Stopwatch Chip, XTL (Evaluation Kit)	19.49
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7216DIPI	28	8 Digit Freq. Counter C.C.	21.49
7217IJI	28	4 Digit LED Up/Down Counter C.A.	10.95
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7224IPL	40	LCD 4½ Digit Up Counter DRI.	10.95
7226AEV/Kit	40	5 Function Counter Chip, XTL (Evaluation Kit)	99.95

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74HC High Speed CMOS

74HC00	14	.59
74HC02	14	.59
74HC03	14	.89
74HC04	14	.59
74HCU04	14	.69
74HC08	14	.59
74HC10	14	.59
74HC11	14	.69
74HC14	14	.89
74HC20	14	.59
74HC27	14	.59
74HC30	14	.69
74HC32	14	.79
74HC42	16	1.09
74HC51	14	.89
74HC58	14	.89
74HC73	14	.79
74HC74	14	.79
74HC75	16	.99
74HC76	16	.79
74HC85	16	1.69
74HC86	14	.75
74HC107	14	.79
74HC109	16	.79
74HC112	16	.79
74HC123	16	2.29
74HC125	14	1.75
74HC132	14	1.29
74HC137	16	1.59
74HC138	16	1.19

74HC139	16	1.05
74HC147	16	1.29
74HC151	16	.99
74HC153	16	1.09
74HC154	24	2.65
74HC157	16	.99
74HC158	16	.99
74HC160	16	1.39
74HC161	16	1.39
74HC162	16	1.39
74HC163	16	1.39
74HC164	14	1.35
74HC165	16	2.15
74HC166	16	2.49
74HC173	16	1.29
74HC174	16	1.09
74HC175	16	1.09
74HC190	16	1.59
74HC191	16	1.59
74HC192	16	1.49
74HC193	16	1.49
74HC194	16	1.19
74HC195	16	1.19
74HC221	16	2.95
74HC237	16	1.49
74HC240	20	2.29
74HC241	20	2.29
74HC242	14	2.15
74HC243	14	2.15
74HC244	20	2.29

74HC245	20	2.59
74HC251	16	.99
74HC253	16	1.09
74HC257	16	.99
74HC259	16	1.69
74HC266	14	.89
74HC273	20	2.79
74HC280	14	4.59
74HC299	20	5.59
74HC366	16	2.59
74HC367	16	2.59
74HC373	20	2.69
74HC374	20	2.69
74HC390	16	1.59
74HC393	14	1.59
74HC533	20	2.69
74HC534	20	2.69
74HC595	16	3.19
74HC688	20	3.59
74HC4024	14	1.75
74HC4040	16	1.49
74HC4060	16	1.49
74HC4075	14	.59
74HC4078	14	.59
74HC4511	16	1.95
74HC4514	24	4.19
74HC4538	16	2.59
74HC4543	16	3.75

74HCU04 is unbuffered.
All others are buffered.

74C—C/MOS

74C00	14	.29
74C02	14	.35
74C04	14	.35
74C08	14	.35
74C10	14	.35
74C14	14	.59
74C20	14	.35
74C30	14	.35
74C32	14	.39
74C42	16	1.19
74C48	16	1.79
74C73	14	.69
74C74	14	.59
74C85	16	1.39
74C86	14	.29
74C89	16	5.95
74C90	14	1.09
74C93	14	1.09
74C95	14	1.19

74C107	14	.79
74C151	16	2.19
74C154	24	3.25
74C157	16	1.75
74C160	16	1.19
74C161	16	1.19
74C162	16	1.19
74C163	16	1.19
74C164	14	1.29
74C165	16	1.29
74C173	16	.89
74C174	16	1.19
74C175	16	1.19
74C192	16	1.39
74C193	16	1.39
74C195	16	1.29
74C221	16	1.75

74C240	20	1.95
74C244	20	1.95
74C373	20	2.29
74C374	20	2.29
74C901	14	.59
74C902	14	.79
74C903	14	.59
74C906	14	.59
74C907	14	.89
74C911	28	8.95
74C912	28	8.95
74C915	18	1.19
74C917	28	8.95
74C922	18	4.49
74C923	20	4.95
74C925	16	5.95
74C926	18	5.95
80C95	16	.69
80C97	16	.69

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TL071CP	8	.79
TL072CP	8	1.09
TL074CN	14	1.95
TL081CP	8	.59
TL082CP	8	1.19
TL084CN	14	1.95
LM109K		5.95
LM301CN	8	.39
LM302H		2.49
LM304H		1.95
LM305H		.99
LM307CN	8	.49
LM308CN	8	.69
LM309K		1.25
LM310CN	8	1.95
LM311CN	8	.59
LM312H		2.79
LM317T		1.19
LM317K		3.49
LM318CN	8	1.59
LM319N	14	1.49
LM320K-5		1.35
LM320K-12		1.35
LM320K-15		1.35
LM320K-24		1.35
LM320T-5		.85
LM320T-12		.85
LM320T-15		.85
LM320T-24		.85
LM322N	14	1.49
LM323K		4.95
LM324N	14	.59
LM329DZ		.65
LM331N	8	3.95
LM334Z		1.19
LM335Z		1.29
LM336Z		1.09
LM337MP		1.15
LM337T		1.89
LM338K		6.95
LM339N	14	.69
LM340K-5		1.35
LM340K-12		1.35
LM340K-15		1.35
LM340K-24		1.35
LM340T-5		.75
LM340T-12		.75
LM340T-15		.75
LM340T-24		.75
LF347N	14	1.49
LM348N	14	.89
LM350K		4.79
LF351N	8	.59
LF353N	8	.89

LF355N	8	1.09
LF356N	8	1.09
LM358N	8	.59
LM359N	14	1.79
LM370N	14	4.95
LM373N	14	4.95
LM377N	14	1.95
LM380CN	8	1.09
LM380N	14	.89
LM381N	14	1.79
LM382N	14	1.49
LM384N	14	1.95
LM386N-3	8	.89
LM387N	8	1.39
LM389N	18	1.19
LM391N-80	16	1.19
LM392N	8	.59
LM393N	8	.45
LF398N	8	3.95
LM399H		5.95
LF412CN	8	1.95
TL494CN	16	2.79
TL496CP	8	1.59
NE531V	8	1.79
NE544N	14	1.95
NE550A	14	1.95
NE555V	8	.35
XR-L555	8	.69
LM556N	14	.79
NE558N	16	1.59
NE564N	16	1.95
LM565N	14	.99
LM566CN	8	1.49
LM567V	8	.99
NE570N	16	2.95
NE571N	16	2.49
NE592N	14	1.19
LM703CN	8	1.49
LM710N	14	.69
LM711N	14	.79
LM723N	14	.49
LM733N	14	.89
LM739N	14	1.95
LM741CN	8	.39

LM747N	14	.69
LM748N	8	.59
UA760HC		9.95
LM1456V	8	1.95
LM1458CN	8	.59
LM1488N	14	.69
LM1489N	14	.69
LM1496N	14	.99
LM1605CK		9.95
LM1800N	16	2.49
LM1871N	18	2.95
LM1872N	18	3.25
LM1877N-9	14	2.95
LM1889N	18	1.95
LM1896N	14	1.59
LM2002T		1.95
ULN2003A	16	1.49
XR2206	16	3.95
XR2207	14	2.49
XR2208	16	1.79
XR2211	14	2.95
LM2877P		1.95
LM2878P		2.95
LM2901N	14	.79
LM2902N	14	.89
LM2907N	14	2.49
LM2917N	8	1.95
LM3900N	14	.59
LM3905CN	8	1.19
LM3909N	8	.89
LM3914N	18	2.39
LM3915N	18	2.39
LM3916N	18	2.39
RC4136N	14	1.25
RC4151NB	8	1.95
RC4195TK		5.95
LM4250CN	8	1.49
LM4500A	16	2.95
NE5532	8	1.69
NE5534	8	1.39
79M05AH		1.29
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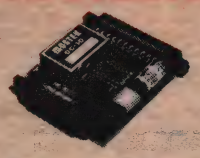

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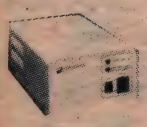

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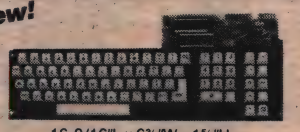

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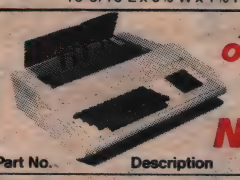

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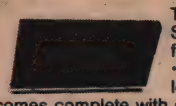

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Inside VIC/C-64

Continued from page 88

renewed effort to compete with Commodore, but I don't think they will be able to take market share away from them. At least not until Atari is in stronger shape financially. Then it will be a real battle! The most interesting aspect of the "low end" is the "no-shows." By now, Commodore was supposed to be competing head-to-head with MSX, Adam, PCjr, and the Apple IIc. So far, only Atari has arrived to slug it out, and it is headed by none other than good old Jack Tramiel himself. It seems he built his old company so strong, he is the only one who can even compete with it! Stay tuned for more laughs!

IN and OUT With The KERNAL

Now that you are familiar with the KERNAL Jump Table and how it supports program portability, you will want to know how to implement I/O and files with it. Let's start by defining just what I/O capability the KERNAL supports.

First, as I mentioned in a previous article, all I/O operations within the KERNAL takes place within the "shell" of a logical file system. Whenever you want to do I/O through the KERNAL, you must do it through the logical file shell. I call this "file oriented" I/O. Each I/O device or file becomes a logical file with a user-specified number when it is OPENed. An OPENed file is then considered an **I/O channel**. I/O may then be freely switched between open channels.

If all of your I/O calls will be through the power-up default I/O devices (input = keyboard and output = screen), you won't have to worry about the details of OPENing, and CLOSEing files. At power-up, the keyboard and screen are assigned channel numbers (0 and 3, respectively). If, however, you want to switch input from the keyboard to a disk file and back, you must know how to OPEN a file from the KERNAL. It's really no problem once you understand the concepts involved.

I'll reiterate the general procedures for using the file shell:

First, OPEN all I/O files you will need. Up to 10 can be OPEN at one time, so it's usually best to set everything up once in the initialization section of a program.

Second, use CKIN, CKOUT, and CLRCHN to switch I/O freely between I/O channels and files.

Third, CLOSE all files when finished with them, to insure that no data is lost (especially important with buffered I/O devices like the cassette, disk drive, and RS-232).

OPEN SESAME

To OPEN a file with the KERNAL you use the routine appropriately named "OPEN" at $FFC0 (see the Programmer's Reference Guide and last month's article for further details). But, before you call OPEN, you need to call SETLFS and maybe SETNAM first. Calling SETLFS tells the KERNAL the logical file number, the device number, and any secondary address you want associated with the file you OPEN. We will be seeing how that is determined shortly.

SETNAM is required if the file you are OPENing will have a name involved. For example, disk or tape files. If the file you are OPENing is to the keyboard, screen, or printer, a name will be meaningless, so you might be tempted to skip calling SETNAM before you OPEN a file to them. Commodore officially recommends that you always call SETNAM before OPEN. If the device requires no name for the file, you should set the name length parameter to 0 and call SETNAM anyway. I think it is a little redundant myself. Calling SETNAM is only required when the file needs a name. Any disk or tape file must have some name associated with it. The disk command channel, however, may be successfully OPENed without a name.

Logical File Numbers

Every channel requires a logical file number. What the file number should be is largely an arbitrary decision made by the programmer. File numbers must be in the range of 0-255. Any file with a logical number greater than 127 has a special feature.

If an ASCII carriage return is sent to the file, it is automatically followed with a line feed as well. This was added to make interfacing with non-Commodore printers easier. Commodore printers do automatic line feeds after carriage returns. They normally don't get line feeds when printing a new line during output from Commodore software. Most other brands do not automatically do a "LF" after "CR." OPENing a file to a non-Commodore printer with a file number larger than 127 overcomes this problem.

If the device you are going to use is anything except a non-Commodore printer that needs line feeds, avoid using file numbers greater than 127. It could be the cause of nasty bugs with other devices.

Although it is not required, most programmers when OPENing I/O channels to devices, use the same file number as the device number. Since the file number becomes the effective channel number after OPENing, it makes it very simple to remember which channel is connected to which device.

Continued on page 95

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Inside VIC/C-64
Continued from page 94

Device Numbers

In addition to logical file numbers, you must also specify the pre-assigned device numbers for the specific peripheral you are accessing. The KERNAL has already decided what the number must be. You just have to make sure you are OPENing the correct file to the correct device number. It will then automatically jump to the correct I/O ROM primitives for the device when you do I/O to that channel.

Commodore doesn't seem to elaborate on the subject of device numbers very much in their literature, but it is an essential part of the KERNAL. Here is a table of the standard assignment of device numbers:

Dev. #	Physical Device
0	Keyboard
1	Cassette #1
2	RS-232 Port (VIC/64), Cassette #2 (PET/CBM)
3	Screen Display
4	Serial (VIC/64) or IEEE (PET/CBM) Bus - Printer
5	Serial (VIC/64) - Printer, IEEE (PET/CBM) - Modem
6-7	Serial or IEEE Bus - Unassigned
8-15	Serial or IEEE Bus - Disk Drive
16-31	Serial or IEEE Bus - Unassigned

Numerous device numbers are assigned to devices like printer and disk drives so you can connect more than one printer or disk drive to a "bus" and then access it by its unique device number. Unassigned device numbers are available for use in custom device drivers that are compatible with the KERNAL.

For example, it would be possible to implement device drivers for unsupported peripherals (like joysticks, paddles, and lightpens) and assign them unused device numbers. You could then use the file "shell" to direct I/O to and from them. Of course, you would still have to write the Assembly language primitives to actually handle the device, but the KERNAL would treat the device I/O like any other peripheral and handle it as a logical file.

This type of "re-programmable" device drivers is considered an advanced feature for microcomputer operating systems. It is one of the main "bells and whistles" associated with MS/PC-DOS 2.0 and is also used in UNIX. Commodore has incorporated this feature into all of their machines as well.

"Secondary Address"

A "secondary address" might more properly be called a "secondary device number." This information must also be specified in the OPEN call. A second address is commonly used to set up special features in a device. For example, OPENing a 1525 printer with a second address of 7 will put it in the "Cursor Down" mode. Text will then be printed with the Upper/Lower case character set instead of the normal upper case/graphics. OPENing the cassette with a second address of 1 and then doing a LOAD to RAM will put the program file into memory at the location specified on the file header. This is commonly called a "non-relocating" LOAD.

Disk drives have several special features that are accessed by a second address. When reading or writing a file to disk, the second address selects the disk channel number. You must specify a channel when accessing the disk drive, so it will allocate a file buffer in disk RAM. Channels 1 and 2 on the disk are reserved for SAVEs and LOADs. Channels 2-14 are available for general data transfer. Channel 15 is the disk command channel. Other channel numbers will be ignored.

Let's Do It!

I believe the best way to understand how KERNAL works is to try it out, so let's look at an example program in Assembly Language that illustrates a KERNAL OPEN.

First, let's OPEN the printer as channel #4. The BASIC command is simple enough:

```
10 OPEN 4,4
```

That makes device #4 (the printer) an I/O channel (logical file) with a number of 4, also. Remember, we could have made it any number between 4-127, with no problem, but 4 is easier to remember. Since a Commodore printer doesn't have INPUT to the computer, this is really only an "O" (or output) channel. Trying to GET from it will generate a "NOT AN INPUT CHANNEL" error. Prove it by typing in:

```
20 GET#4,A$
```

and then RUNing it. See? It only works as an output. The screen, on the other hand, works both ways. That's an interesting possibility!?!

Here's how the above OPEN would be done in Assembly (source only):

```
;THIS ROUTINE OPENS A
  FILE
;USING THE KERNAL.
;
SETLFS = $FFBA ;SET A
  LOGICAL FILE # , 1+2
  ADDRS.
SETNAM = $FFBD ;SET
  FILE NAME, IF
  NEEDED.
OPEN = $FFCO ;OPEN A
  PRE-DEFINED FILE.
;
;
LDA #$04 ;CHANNEL # (LF
  #) IS 4.
LDX #$04 ;DEVICE #IS 4
  (PRINTER).
LDY #$FF ;NO SECOND
  ADDRESS (USE #$FF).
JSR SETLFS
;
LDA #$00 ;NO NAME FOR
  PRINTER.
JSR SETNAME ;(THIS IS
  ACTUALLY OPTIONAL).
;
JSR OPEN ;THIS ACTUAL-
  LY OPENS THE FILE.
.END
```

Notice that you do not have to load any registers to communicate with OPEN. It assumes that you are OPENing a file that you have just defined with SETLFS and SETNAM. The CPU registers can have any value when calling OPEN and it won't affect the process.

Notice also that if you are using no second address with the file, you put an #$FF in Y, not a #$00. Just why I don't know, but that is what the KERNAL calls for, so do it and prevent problems.

Even though the printer needs no filename (in fact, it will ignore it if I send it one), I still called SETNAM. As I mentioned previously, you don't have to call SETNAM in this case, but Commodore recommends that you do. For the sake of preventing future compatibility problems, I would consider doing it. Since you normally only OPEN a file once during a program, the few bytes and milliseconds you save by ignoring the call may come back to haunt you later (especially if your program gets "ported" to another Commodore model with a flaky I/O system).

Files With Names

So much for OPENing files without names. What happens if you want to OPEN a disk or tape file though? How do you send the name to SETNAME? Good question. Next month, we'll pick up on that subject. Until then, experiment with switching output between the screen and printer using the KERNAL. (Call CHKIN with the new output channel #. After doing the OPEN: Call CLRCHN to restore the screen as the default.) I think you'll begin to see the KERNAL can save you a lot of headaches in your programming. ●

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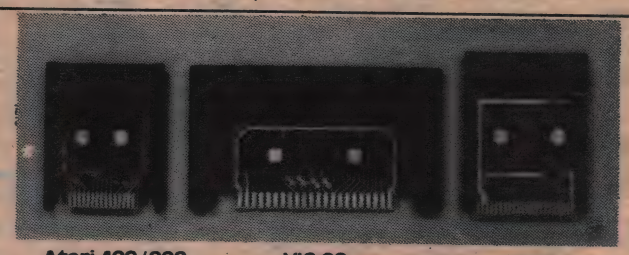

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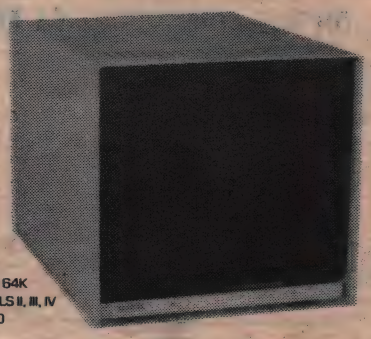

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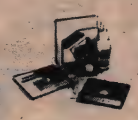

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Commodore Reviews

by Cheryl Peterson

Quartet from Quicksilva

Fred - joystick required
Chuckie Egg - joystick required
Ant Attack - joystick required
The Pyramid - joystick optional

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Available for Commodore 64 on disk.

These four new releases from Quicksilva have several things in common. All are imported from England, where they were best-sellers. All have great graphics and sound. All are arcade style games that come in book-style plastic boxes. All are $24.95 on disk.

Ant Attack

This game won an award for excellent graphics and it's easy to see why. The 3-dimensional effect is unique, however, the perspective is a little unbalancing. It's rather like floating in a balloon and looking at something several hundreds yards ahead without being able to turn your head and see what is directly below you. Using the function keys, you can change the direction from which you view your progress, but you can never look straight down or straight ahead.

The game scenario is interesting. Your companion is trapped in the city of Antescher and can't get out without help. Since you have the grenades, it's up to you to go in for a rescue. Saving your compadre is complicated by nasty ants that bite, enough bites and you're eaten alive.

There are some nice features to the program; you can choose to be male or female. (I love sexist games that assume the woman would be wearing the dress and have long hair. Considering this program came from England, you'd expect them to anticipate that Boy George might want to give it a try.) I do have to give them credit for at least contemplating that a man could be trapped and need to be saved.

The game moves at a rapid clip and I could only find minor faults with it. It has a restart function that doesn't reset your score; it just sets you down outside the city again. There is no way to really start over without rebooting. If you use all your grenades in the first few seconds or do something equally silly, it takes about five minutes to get back to square one.

I can't really say I enjoyed this game. The graphics were nice, but there's little time to enjoy them with the ants closing in. When they do catch up to you, getting away is almost impossible. No matter what direction you turn, there seems to be a wall or an ant in your way. (By the way, you can jump up on short walls, the ants can't.)

This one didn't make it to my list of games to play when I finally have the time to play games.

Chuckie Egg

Chuckie Egg didn't make it, either. A Donkey Kong look alike, this program has you gathering eggs in a hen house with unfriendly little ducklings. Getting pecked too many times throws you out of the game. Elevators, holes in the floor faster ducklings and varying play fields are designed to make your task difficult. On the most difficult level, the mother duck will break out of her cage and try to trounce you.

The graphics were good, the execution speed was fine. I guess too many trips to my grandfather's real henhouse spoiled this one for me. I can't really get excited over whether or not a few ducks peck my shoes. Kids might enjoy the action, and at least it isn't a shoot 'em up where the points is to kill everything in sight.

Fred

Fred is a nice little game; certainly a pleasant way to spend a couple of hours on a rainy afternoon. Your character is an Indiana Jones type explorer bent on searching a pyramid for the lost treasures hidden within. These include ankhs, statues, scrolls and occasionally tools which you can use; bombs, guns and bullets. The bombs are needed to open the way to new levels.

You must maintain your strength in order to continue

Continued on page 100

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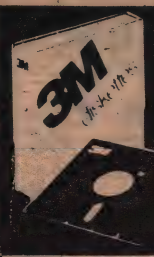

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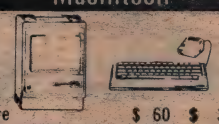

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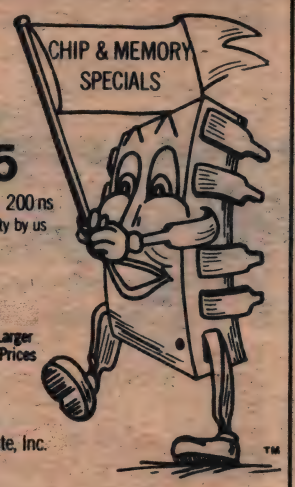

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Commodore Reviews
Continued from page 96

level by level through the maze. Ropes have been strung connecting the passageways which are haunted by ghosts, mummies and other meanies. Avoid them if you wish to stay strong. Acid drips from the ceiling in places, so watch out for it.

I really enjoyed this game and look forward to spending time with it again.

The Pyramid

Saving the best for last, I have to admit that of these four games, the Pyramid is the one I's reach for first. There are 120 rooms in the pyramid and each contains a secret number. You, the intrepid explorer, are equipped with an exploration capsule whose defense shield will disintegrate anything that comes in contact with it. This is a big plus, since most of the things that you run into are deadly. Unfortunately, the defense shield requires a lot of energy to work; more so to zap things. You are also armed with a laser cannon, which uses much less energy to destroy attackers than the defense shield.

Getting from one room to the next requires capturing some crystals that occasionally fall through the center of the room. These must then be dropped through the energy field separating you from the next chamber. Each crystal drains some of the energy. When all the field's energy is gone, you can pass.

This game has some of the most creative opponents I've seen. It throws everything at you but the kitchen sink. Well, maybe. I haven't run into any creatures that look like kitchen sinks, yet. But I've only reached the ninth level and I still have a hundred rooms left to explore.

Safely leaving the room will usually reveal that chamber's secret number. Learning all the numbers should reveal the answer to the Ultimate question. For those of you who are fans of "Life, the Universe and Everything," I haven't progressed far enough to tell you if the answer is the same one as in the books.

Since the numbers are not displayed on the screen indefinitely, you'll need a pen and a piece of paper to write down each room's number. The numbers don't change each time the game is played, so it is possible to negotiate a different set of chambers each time and eventually get all the numbers without having to go through 120 chambers in succession. Some of the chamber's numbers appear as a bunch of question marks. These you'll have to figure out later.

Continued on page 101

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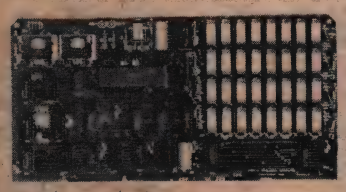

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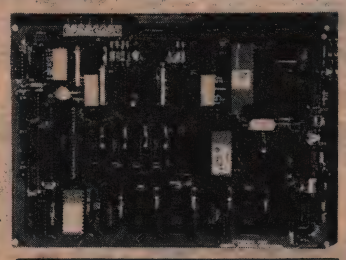

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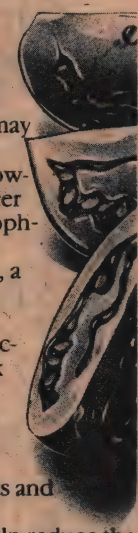
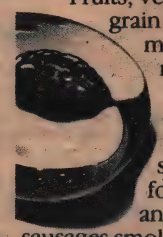
A defense against cancer can be cooked up in your kitchen.



There is evidence that diet and cancer are related. Some foods may promote cancer, while others may protect you from it.

Foods related to lowering the risk of cancer of the larynx and esophagus all have high amounts of carotene, a form of Vitamin A which is in cantaloupes, peaches, broccoli, spinach, all dark green leafy vegetables, sweet potatoes, carrots, pumpkin, winter squash, and tomatoes, citrus fruits and brussels sprouts.

Foods that may help reduce the risk of gastrointestinal and respiratory tract cancer are cabbage, broccoli, brussels sprouts, kohlrabi, cauliflower.



Fruits, vegetables and whole-grain cereals such as oatmeal, bran and wheat may help lower the risk of colorectal cancer.

Foods high in fats, salt- or nitrite-cured foods such as ham, and fish and types of sausages smoked by traditional methods should be eaten in moderation.

Be moderate in consumption of alcohol also.

A good rule of thumb is cut down on fat and don't be fat. Weight reduction may lower cancer risk. Our 12-year study of nearly a million Americans uncovered high cancer risks particularly among people 40% or more overweight.

Now, more than ever, we know you can cook up your own defense against cancer. So eat healthy and be healthy.

No one faces cancer alone.

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Commodore Reviews Continued from page 100

The action is fast and furious. The game plan not too elusive. And a little skill will get you far enough into the game to be hooked. There is a pause after each chamber, so you can take a breather when your hands and arms get tired.

My only objection to the game would be its basic premise that destroying alien life forms (as the directions identify your opponents in each chamber) is the only way to negotiate the pyramid and learn the numbers. Couldn't they have called them robots or androids? In most cases, they look like machines of one sort or another, anyway.

I give this game an "A" for originality, an "A" for graphics and an "A" for playability. Try it!

The Oddsmaker

The Oddsmaker
CZ Software
358 Forest Road
South Yarmouth, MA 02664
(617) 771-4155

Available for: Commodore 64, all Apple II's and Apple III (in Emulate mode), soon on IBM PC and jr.

Price: $44.95

On first hearing of this program, I wondered at its usefulness. What exactly would you use it for?

It's main purpose is to keep track of wagers for betting events and figuring out how much each winner should be paid. If the user wishes, bettor's and cashier's tickets can be printed to track the individual bets.

I must admit to a slightly unusual curiosity, however, because I occasionally enjoy a night at the track watching the greyhounds. Invariably, I lose my self-allotted $20 betting money and head home. By picking a winner once in a while, I can prolong the inevitable. The one facet of this entertainment that has intrigued me though, is how the track figures out how much I've won. Figuring out how much I've lost is always easy; just see how much I have left and subtract that from how much I brought.

By fiddling around with this program, parimutuel betting becomes less of a mystery.

To start with, the author assumes you know little or nothing about figuring wagers and payoffs. The documentation leads with an explanation of parimutuel betting, plain and simple. It then outlines what Oddsmaker does to make it easy for you to control a betting event's information; who bet, how much, and on what. When a winner has been determined, all the bettor's payouts are figured for you.

The Oddsmaker assures that the "house," as the person who controls the money is called, gets its payment, too. The "house cut," a percentage of all the bets placed, is subtracted from the total before each bettor's winnings are calculated.

This program has many things going for it. The documentation is well done. The features have been well thought out. Oddsmaker does everything necessary to make it easy to run a wagering game.

There are three different screens in which you can enter bets, depending on what you want the bettors to see while you enter their wagers. One displays only an announcement, something you type in (PICK A WINNER, for instance.) Another displays the current odds based on bets already placed. The third shows the anticipated payout

Continued on page 102

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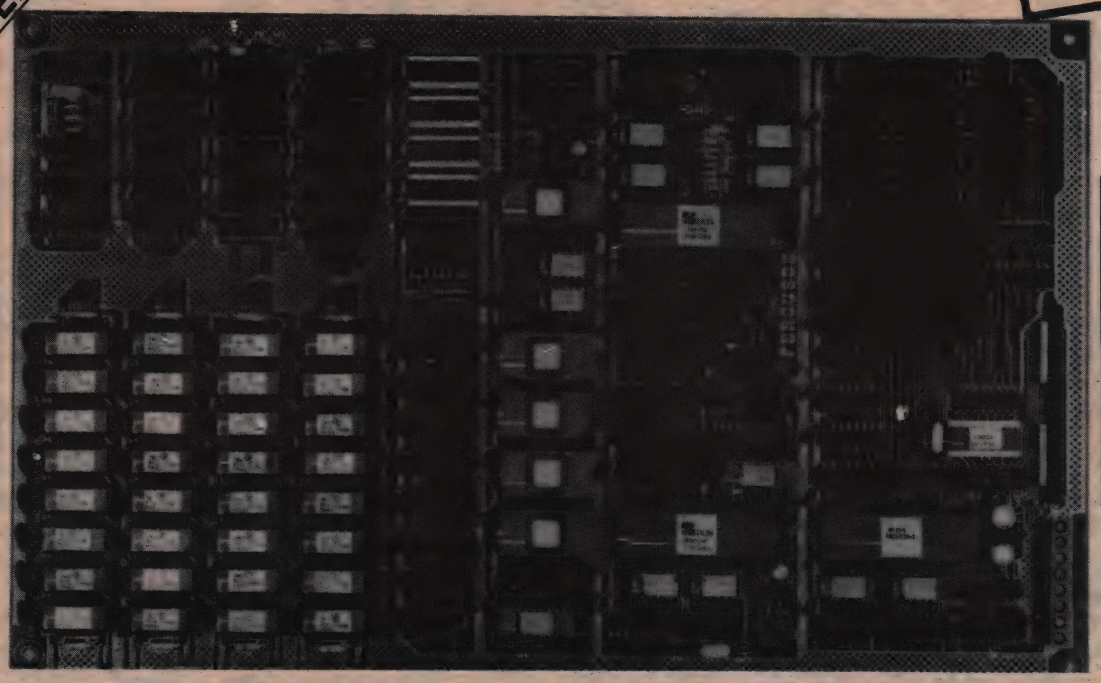

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Uses WD1771 controller chip with a TTL Data Separator for enhanced reliability. IBM 3740 compatible. Supports up to four 8 inch disc drives. Directly compatible with standard Shugart drives such as the SA800 or SA801. Drives can be configured for remote AC off-on. Runs CP/M* 2.2.

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The real power of the Big Board lies in its PFM 3.3 on board monitor. PFM commands include: Dump Memory, Boot CP/M*, Copy, Examine, Fill Memory, Test Memory, Go To, Read and Write I/O Ports, Disc Read (Drive, Track, Sector), and Search PFM occupies one of the four 2716 EPROM locations provided. Z-80 is a Trademark of Zilog.

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Commodore Reviews
Continued from page 101

for a $1 bet based on current bets placed. The screen display is updated after each bet.

As mentioned earlier the system will also print tickets. (See Figure 1.) Two tickets are printed with each bet; one for the bettor and one for the cashier. Since each bettor's name can be printed on the ticket, it's easy to confirm bets. A special message can also be printed making it easy to tell which event the ticket was printed for. This option can be turned on or off at will.

The Oddsmaker can track 14 events with up to 14 pools in each one. Event information is saved on the disk with the program, so no disk swapping is necessary. This limits you to 14 events at a time, though. A backup program disk is available for $5, so there is some protection against not being able to pay everyone because the dog ate the disk. Since the system is only marketed for entertainment purposes, 14 events should probably be enough.

There are lots of good things to say about this program. The program's author John Zeig has done a good job of making the program idiot-proof. The documentation is more than adequate, with ample warning provided in any area where you can destroy your information. The prompts are well conceived. All data input is checked for adequacy; numbers for number entry, characters for alphabetic prompts. Before accepting bets, the system confirms what you've entered and offers a way out if there's a change of heart. Bets can be cancelled later by entering a negative value, if an error goes undetected.

The payout amounts may be slightly off, since the system rounds figures up to the nearest cent. But that's only a small amount.

All in all, I thought this was a well designed and executed program. The printout looked fine and the figures seemed reasonable. Data entry was efficient. If you have a use for a program of this type -- figuring the office betting pool or just keeping track of a few friendly wagers -- this program will certainly do the trick. I can't say I've seen a better program for this purpose, but then, I haven't seen any others like it being marketed.

The only improvements I could imagine would be to increase the number of competitors available or to provide extra disks (at a nominal cost) to store data on. A screen print option for the events on the disk, odds, payouts, and betting pools and house cut information would also be nice.

For what it does though, this is an excellent little program and the price is certainly in line with the package's quality and function. Who knows, maybe you'd like to set up a few side bets on the next Bridge tournament?

```
$$$$$$$$$$$$$$$$$$   $$$$$$$$$$$$$$$$$$
$ ALL-TIME         $   $ ALL-TIME         $
$ GREAT HORSES     $   $ GREAT HORSES     $
$                  $   $                  $
$ NAME SAM         $   $ NAME SAM         $
$                  $   $                  $
$ NBR 1  AMT 560   $   $ NBR 1  AMT 560   $
$                  $   $                  $
$ BETTOR'S COPY    $   $ CASHIER'S COPY   $
$$$$$$$$$$$$$$$$$$   $$$$$$$$$$$$$$$$$$

$$$$$$$$$$$$$$$$$$   $$$$$$$$$$$$$$$$$$
$ ALL-TIME         $   $ ALL-TIME         $
$ GREAT HORSES     $   $ GREAT HORSES     $
$                  $   $                  $
$ NAME JOE         $   $ NAME JOE         $
$                  $   $                  $
$ NBR 2  AMT 340   $   $ NBR 2  AMT 340   $
$                  $   $                  $
$ BETTOR'S COPY    $   $ CASHIER'S COPY   $
$$$$$$$$$$$$$$$$$$   $$$$$$$$$$$$$$$$$$
```

Figure 1

Ultima II

Ultima II
Sierra On-Line
Sierra On-Line Building
Coarsegold, CA 93614
209-683-6858

Suggested Retail: $59.95 (all versions)

Available for: Commodore 64 (disk), Apple (disk), Atari (disk) and IBM PC and jr (disk).

At first glance, Ultima II's price seems inordinately high. But once you've got the game and tried it, it seems reasonable. There are few games that I've played (and I've played more than a few) that can hold interest like this one. You'll easily spend months trying to figure it out.

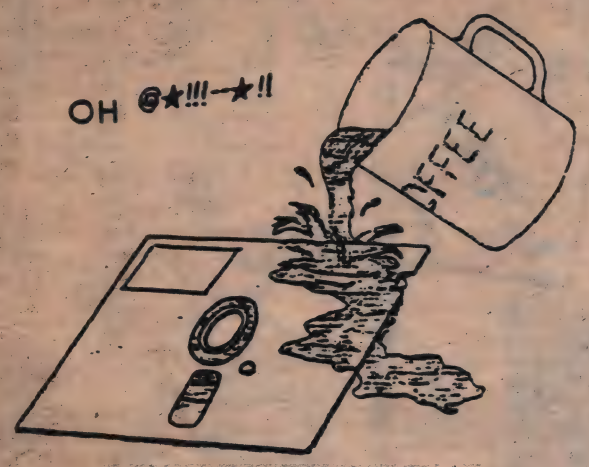
Ultima II is an animated fantasy role-playing adventure game, for one player. You create a character, an alter ego of sorts, who will wander around the world searching for weapons, armor, gold, treasure and the means to win the game. Your character may be male or female; a thief, fighter, wizard, or cleric; a human, dwarf, elf or hobbit. Each of these features endows your other self with certain characteristics; strength, intelligence, wisdom, agility, stamina or charisma. Clerics and wizards can cast magic spells, which could be helpful in a jam.

One amazing feature of this game is its scope. Through the use of time doors, the character can explore the Ultima II world in five different time periods. A beautifully crafted cloth map is included to show the doors' locations and destinations. Since the doors transport you through both time and space, it helps to know where you are likely to end up. In addition, when the character becomes sufficiently developed, the solar system opens up for exploration.

Which leads to another nice feature, multiple means of transportation; on foot, on

Continued on page 109

Introducing Disk Clone



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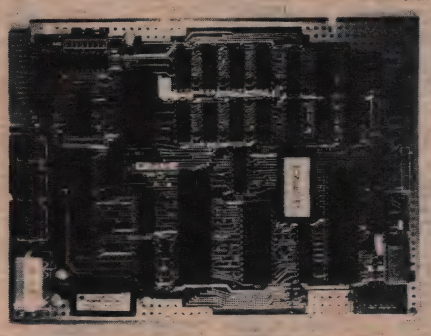

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Brett D'Ambrosio
Cornell University
Ithaca N.Y.

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Mark P. Lill

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Very Truly Yours,
James L. Stewart

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74LS26	.29	74LS248	.99
74LS27	.29	74LS249	.99
74LS28	.35	74LS251	.59
74LS30	.25	74LS253	.59
74LS32	.29	74LS257	.59
74LS33	.55	74LS258	.59
74LS37	.35	74LS259	2.75
74LS38	.35	74LS260	.59
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74LS48	.75	74LS275	3.35
74LS49	.75	74LS279	.49
74LS51	.25	74LS280	1.98
74LS54	.29	74LS283	.69
74LS55	.29	74LS290	.89
74LS63	1.25	74LS293	.89
74LS73	.39	74LS295	.99
74LS74	.35	74LS298	.89
74LS75	.39	74LS299	1.75
74LS76	.39	74LS322	5.95
74LS78	.49	74LS323	3.50
74LS83	.60	74LS324	1.75
74LS85	.69	74LS348	2.50
74LS86	.39	74LS352	1.29
74LS90	.55	74LS353	1.29
74LS91	.89	74LS363	1.35
74LS92	.55	74LS364	1.95
74LS93	.55	74LS365	.49
74LS95	.75	74LS366	.49
74LS96	.89	74LS367	.45
74LS107	.39	74LS368	.45
74LS109	.39	74LS373	1.39
74LS112	.39	74LS374	1.39
74LS113	.39	74LS375	.95
74LS114	.39	74LS377	1.39
74LS122	.45	74LS378	1.18
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Z80A-DMA	9.95
Z80A-PIO	3.95
Z80A-SIO/0	10.95
Z80A-SIO/1	10.95
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6.0 MHz

Z80B-CPU	8.95
Z80B-CTC	9.95
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Z80B-SIO/0	29.95
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Z8671	39.95

6500

1.0 MHz

6502	4.95
65C02(CMOS)	12.95
6504	6.95
6505	8.95
6507	9.95
6520	2.95
6522	5.49
6532	9.95
6545	9.95
6551	9.95

2.0 MHz

6502A	5.95
6520A	5.95
6522A	9.95
6532A	11.95
6545A	12.95
6551A	11.95

3.0 MHz

6502B	8.95

UARTS

AY5-1013	3.95
AY3-1015	6.95
PT1472	9.95
TR1602	3.95
2350	9.95
2651	8.95
IM6402	7.95
IM6403	8.95
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INS8520	10.95

6800

68000-8	39.95
6800	2.95
6802	7.95
6803	19.95
6808	13.90
6809E	8.95
6809	8.95
6810	2.95
6820	4.35
6821	2.95
6828	14.95
6840	12.95
6843	34.95
6844	25.95
6845	12.95
6847	11.95
6850	3.25
6852	5.75
6860	7.95
6875	6.95
6880	2.25
6883	22.95
68047	24.95
68488	19.95

6800=1 MHz

68B00	10.95
68B02	11.95
68B09E	11.95
68B09	11.95
68B10	5.95
68B21	5.95
68B40	19.95
68B45	19.95
68B50	5.95

68B00=2 MHz

8000

8031	29.95
8035	5.95
8039	5.95
INS-8060	17.95
INS-8073	49.95
8080	3.95
8085	4.95
8085A-2	11.95
8086	24.95
8087	175.00
8088	19.95
8089	69.95
8155	6.95
8155-2	7.95
8156	6.95
8185	29.95
8185-2	39.95
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8748	24.95
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3341	4.95
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MC3480	9.00
11C90	13.95
95H90	7.95
2513-001 up	9.95
2513-002 low	9.95

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8202	24.95
8203	39.95
8205	3.50
8212	1.80
8214	3.85
8216	1.75
8224	2.25
8226	1.80
8228	3.49
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8237-5	15.95
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8243	4.45
8250	10.95
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8251A	4.49
8253	6.95
8253-5	7.95
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8255-5	5.25
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8257-5	8.95
8259	6.90
8259-5	7.50
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74S03	.35	74S139	.85	74S253	.95
74S04	.35	74S140	.55	74S257	.95
74S05	.35	74S151	.95	74S258	.95
74S08	.35	74S153	.95	74S260	.79
74S09	.40	74S157	.95	74S273	2.45
74S10	.35	74S158	.95	74S274	19.95
74S11	.35	74S161	1.95	74S275	19.95
74S15	.35	74S162	1.95	74S280	1.95
74S20	.35	74S163	1.95	74S283	3.29
74S22	.35	74S168	3.95	74S287	1.90
74S30	.35	74S169	3.95	74S288	1.90
74S32	.40	74S174	.95	74S289	6.98
74S37	.88	74S175	.95	74S299	7.35
74S38	.85	74S180	11.95	74S301	6.95
74S40	.35	74S181	3.95	74S373	2.45
74S51	.35	74S182	2.95	74S374	2.45
74S64	.40	74S185	16.95	74S381	7.95
74S65	.40	74S188	1.95	74S387	1.95
74S74	.50	74S189	6.95	74S399	2.95
74S85	1.99	74S194	1.49	74S412	2.98
74S86	.50	74S195	1.49	74S470	6.95
74S112	.50	74S196	1.49	74S471	4.95
74S113	.50	74S197	1.49	74S472	4.95
74S114	.55	74S201	6.95	74S474	4.95
74S124	2.75	74S225	7.95	74S570	2.95
74S132	1.24	74S226	3.99	74S571	2.95
74S133	.45	74S240	2.20	74S573	9.95
74S134	.50	74S241	2.20	87S181	16.25
				87S185	16.95

7400

7400	.19	7483	.50	74172	5.95
7401	.19	7485	.59	74173	.75
7402	.19	7486	.35	74174	.89
7403	.19	7489	2.15	74175	.89
7404	.19	7490	.35	74176	.89
7405	.25	7491	.40	74177	.75
7406	.29	7492	.50	74178	1.15
7407	.29	7493	.35	74179	1.75
7408	.24	7494	.65	74180	.75
7409	.19	7495	.55	74181	2.25
7410	.19	7496	.70	74182	.75
7411	.25	7497	2.75	74184	2.00
7412	.30	74100	1.75	74185	2.00
7413	.35	74105	1.14	74189	2.99
7414	.49	74107	.30	74190	1.15
7416	.25	74109	.45	74191	1.15
7417	.25	74110	.45	74192	.79
7420	.19	74111	.55	74193	.79
7421	.35	74116	1.55	74194	.85
7422	.35	74120	1.20	74195	.85
7423	.29	74121	.29	74196	.79
7425	.29	74122	.45	74197	.75
7426	.29	74123	.49	74198	1.35
7427	.29	74125	.45	74199	1.35
7428	.45	74126	.45	74221	1.35
7430	.19	74128	.55	74246	1.35
7432	.29	74132	.45	74247	1.25
7433	.45	74136	.50	74248	1.85
7437	.29	74141	.65	74249	1.95
7438	.29	74142	2.95	74251	.75
7439	.79	74143	4.95	74259	2.25
7440	.19	74144	2.95	74265	1.35
7442	.49	74145	.60	74273	1.95
7443	.65	74147	1.75	74276	1.25
7444	.69	74148	1.20	74278	3.11
7445	.69	74150	1.35	74279	.75
7446	.69	74151	.55	74283	2.00
7447	.69	74152	.65	74284	3.75
7448	.69	74153	.55	74285	3.75
7450	.19	74154	1.25	74290	.95
7451	.23	74155	.75	74293	.75
7453	.23	74156	.65	74298	.85
7454	.23	74157	.55	74351	2.25
7460	.23	74159	1.65	74365	.65
7470	.35	74160	.85	74366	.65
7472	.29	74161	.69	74367	.65
7473	.34	74162	.85	74368	.65
7474	.33	74163	.69	74376	2.20
7475	.45	74164	.85	74390	1.75
7476	.35	74165	.85	74393	1.35
7480	.59	74166	1.00	74425	3.15
7481	1.10	74167	2.96	74426	.85
7482	.95	74170	1.65	74490	2.55

CMOS

4000	.29	4532	1.95
4001	.25	4538	1.95
4002	.25	4539	1.95
4006	.89	4541	2.64
4007	.29	4543	1.19
4008	.95	4553	5.79
4009	.39	4555	.95
4010	.45	4556	.95
4011	.25	4558	2.45
4012	.25	4560	4.25
4013	.38	4569	3.49
4014	.79	4581	1.95
4015	.39	4582	1.95
4016	.39	4584	.75
4017	.69	4585	.75
4018	.79	45151	12.95
4019	.39	4702	12.95
4020	.75	4724	1.50
4021	.79	74C00	.35
4022	.79	74C02	.35
4023	.29	74C04	.35
4024	.65	74C08	.35
4025	.29	74C10	.35
4026	1.65	74C14	.59
4027	.45	74C20	.35
4028	.69	74C30	.35
4029	.79	74C32	.39
4030	.39	74C42	1.29
4034	1.95	74C48	1.99
4035	.85	74C73	.65
4040	.75	74C74	.65
4041	.75	74C76	.80
4042	.69	74C83	1.95
4043	.85	74C85	1.95
4044	.79	74C86	.39
4046	.85	74C89	4.50
4047	.95	74C90	1.19
4048	.69	74C93	1.75
4049	.35	74C95	.99
4050	.35	74C150	5.75
4051	.79	74C151	2.25
4052	1.99	74C154	3.25
4053	.79	74C157	1.75
4060	.89	74C160	1.19
4066	.39	74C161	1.19
4068	.39	74C162	1.19
4069	.29	74C163	1.19
4070	.35	74C164	1.39
4071	.29	74C165	2.00
4072	.29	74C173	.79
4073	.29	74C174	1.19
4075	.29	74C175	1.19
4076	.79	74C192	1.49
4077	.59	74C193	1.49
4078	.29	74C195	1.39
4081	.29	74C200	5.75
4082	.29	74C221	1.75
4085	.95	74C244	2.25
4086	.95	74C373	2.45
4093	.49	74C374	2.45
4094	2.99	74C901	.39
4098	2.49	74C902	.85
4099	1.95	74C903	.85
14409	12.95	74C905	10.95
14410	12.95	74C906	.95
14411	11.95	74C907	1.00
14412	12.95	74C908	2.00
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14433	14.95	74C910	9.95
4502	.95	74C911	8.95
4503	.65	74C912	8.95
4507	1.25	74C914	1.95
4508	1.95	74C915	1.19
4510	.85	74C918	2.75
4511	.85	74C920	17.95
4512	.85	74C921	15.95
4514	1.25	74C922	4.49
4515	1.79	74C923	4.95
4516	1.55	74C925	5.95
4518	.89	74C926	7.95
4519	.39	74C927	7.95
4520	.79	74C928	7.95
4521	4.99	74C929	19.95
4522	1.25	74C930	4.95
4526	1.25	80C95	.85
4527	1.95	80C96	.95
4528	1.19	80C97	.95
4529	2.95	80C98	1.20
4531	.95		

HIGH SPEED CMOS

A new family of high speed CMOS logic featuring the speed of low power Schottky (8ns typical gate propagation delay), combined with the advantages of CMOS: very low power consumption, superior noise immunity, and improved output drive.

74HC00

74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

74HC00	.59	74HC175	.99
74HC02	.59	74HC193	1.25
74HC04	.59	74HC194	1.04
74HC08	.59	74HC195	1.09
74HC10	.59	74HC238	1.35
74HC11	.59	74HC240	1.89
74HC14	.79	74HC241	1.89
74HC20	.59	74HC242	1.89
74HC27	.59	74HC243	1.89
74HC30	.59	74HC244	1.89
74HC32	.69	74HC245	1.89
74HC51	.59	74HC251	.89
74HC74	.75	74HC257	.85
74HC75	.85	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC367	.99
74HC125	1.19	74HC373	2.29
74HC132	1.19	74HC374	2.29
74HC138	.99	74HC393	1.39
74HC139	.99	74HC4017	1.99
74HC151	.89	74HC4020	1.39
74HC153	.89	74HC4024	1.59
74HC154	2.49	74HC4040	1.39
74HC157	.89	74HC4049	.89
74HC161	1.15	74HC4050	.89
74HC164	1.25	74HC4060	1.29
74HC166	2.95	74HC4511	2.39
74HC174	.99	74HC4538	2.29

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT175	1.09
74HCT02	.69	74HCT193	1.39
74HCT04	.69	74HCT194	1.19
74HCT08	.69	74HCT195	1.29
74HCT10	.69	74HCT238	1.49
74HCT11	.69	74HCT240	2.19
74HCT14	.89	74HCT241	2.19
74HCT20	.69	74HCT242	2.19
74HCT27	.69	74HCT243	2.19
74HCT30	.69	74HCT244	2.19
74HCT32	.79	74HCT245	2.19
74HCT51	.69	74HCT251	1.09
74HCT74	.85	74HCT257	.99
74HCT75	.95	74HCT259	1.59
74HCT85	1.49	74HCT273	2.09
74HCT86	.79	74HCT299	5.25
74HCT93	1.29	74HCT367	1.09
74HCT125	1.29	74HCT373	2.49
74HCT132	1.29	74HCT374	2.49
74HCT138	1.15	74HCT393	1.59
74HCT139	1.15	74HCT4017	2.19
74HCT151	1.05	74HCT4020	1.59
74HCT153	1.05	74HCT4024	1.79
74HCT154	2.99	74HCT4040	1.59
74HCT157	.99	74HCT4049	.99
74HCT161	1.29	74HCT4050	.99
74HCT164	1.39	74HCT4060	1.49
74HCT166	3.05	74HCT4511	2.69
74HCT174	1.09	74HCT4538	2.59

VOLTAGE REGULATORS

TO-220 CASE PACKAGE

7805T	.75	7905T	.85
7808T	.75	7908T	.85
7812T	.75	7912T	.85
7815T	.75	7915T	.85
7824T	.75	7924T	.85

TO-3 CASE PACKAGE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49
7815K	1.39	7915K	1.49
7824K	1.39	7924K	1.49

TO-92 CASE PACKAGE

78L05	.69	79L05	.79
78L12	.69	79L12	.79
78L15	.69	79L15	.79

OTHER VOLTAGE REGS

78M05C	5volt	½amp	TO-220	.35
LM323K	5volt	3amp	TO-3	4.95
LM338K	Adj.	5amp	TO-3	3.95
78H05K	5volt	5amp	TO-3	9.95
78H12K	12volt	5amp	TO-3	9.95
78P05K	5volt	10amp	TO-3	14.95
UA78S40	FAIRCHILD		DIP	1.95

LINEAR

LM301	.34	LM567	.89
LM301H	.79	NE570	3.95
LM307	.45	NE571	2.95
LM308	.69	NE590	2.50
LM308H	1.15	NE592	.98
LM309H	1.95	LM709	.59
LM309K	1.25	LM710	.75
LM310	1.75	LM711	.79
LM311	.64	LM723	.49
LM311H	.89	LM723H	.55
LM312H	1.75	LM733	.98
LM317K	3.95	LM741	.35
LM317T	1.19	LM741N-14	.35
LM318	1.49	LM741H	.40
LM318H	1.59	LM747	.69
LM319H	1.90	LM748	.59
LM319	1.25	LM1014	1.19
LM320	see7900	LM1303	1.95
LM322	1.65	LM1310	1.49
LM323K	4.95	MC1330	1.69
LM324	.59	MC1349	1.89
LM329	.65	MC1350	1.19
LM331	3.95	MC1358	1.69
LM334	1.19	MC1372	6.95
LM335	1.40	MC1414	1.59
LM336	1.75	LM1458	.59
LM337T	1.95	LM1488	.69
LM337K	3.95	LM1489	.69
LM338K	3.95	LM1496	.85
LM339	.99	LM1558H	3.10
LM340	see7800	LM1800	2.37
LM348	.99	LM1812	8.25
LM350K	4.95	LM1830	3.50
LM350T	4.60	LM1871	5.49
LM358	.69	LM1872	5.49
LM359	1.79	LM1877	3.52
LM376	3.75	LM1889	1.95
LM377	1.95	LM1896	1.75
LM378	2.50	ULN2003	1.29
LM379	4.50	XR2206	3.75
LM380	.89	LM2877	2.05
LM380N-8	1.10	LM2878	2.25
LM381	1.60	LM2900	.85
LM382	1.60	LM2901	1.00
LM383	1.95	MPQ2907	1.95
LM384	1.95	LM2917	2.95
LM386	.89	LM3900	.59
LM387	1.40	LM3905	1.25
LM389	1.35	LM3909	.98
LM390	1.95	LM3911	2.25
LM392	.69	LM3914	3.95
LM393	1.29	LM3915	3.95
LM394H	4.60	LM3916	3.95
LM399H	5.00	MC4024	3.95
NE531	2.95	MC4044	4.50
NE555	.34	RC4136	1.25
NE556	.65	RC4151	3.95
NE558	1.50	LM4250	1.75
NE564	2.95	LM4500	3.25
LM565	.99	RC4558	.69
LM566	1.49	LM13600	1.49
		LM13700	1.45

H=TO-5 CAN, K=TO-3, T=TO-220

RCA

CA3023	2.75	CA3083	1.55
CA3039	1.29	CA3086	.80
CA3046	1.25	CA3089	2.99
CA3059	2.90	CA3096	3.49
CA3060	2.90	CA3130	1.30
CA3065	1.75	CA3140	1.15
CA3080	1.10	CA3146	1.85
CA3081	1.65	CA3160	1.19
CA3082	1.65	CA3183	.99

TI

TL494	4.20	75365	1.95
TL496	1.65	75450	.59
TL497	3.25	75451	.39
75107	1.49	75452	.39
75108	1.49	75453	.39
75110	1.95	75454	.39
75150	1.95	75491	.79
75154	1.95	75492	.79
75188	1.25	75493	.89
75189	1.25	75494	.89

BI FET

TL066	.99	LF347	2.19
TL071	.79	LF351	.60
TL072	1.19	LF353	1.00
TL074	2.19	LF355	1.10
TL081	.79	LF356	1.10
TL082	1.19	LF357	1.40
TL083	1.19	LF411	1.29
TL084	2.19	LF412	1.99

SPECTRONICS CORPORATION

EPROM ERASERS

	Timer	Capacity Chip	Intensity (uW/Cm²)	
PE-14		9	8,000	$83.00
PE-14T	x	9	8,000	$119.00
PE-24T	x	12	9,600	$175.00
PL-265T	x	30	9,600	$255.00
PR-125T	x	25	17,000	$349.00
PR-320T	x	42	17,000	$595.00

TRANSISTORS

2N918	.50	2N3772	1.85
MPS918	.25	2N3903	.25
2N2102	.75	2N3904	.10
2N2218	.50	2N3906	.10
2N2218A	.50	2N4122	.25
2N2219	.50	2N4123	.25
2N2219A	.50	2N4249	.25
2N2222	.25	2N4304	.75
PN2222	.10	2N4401	.25
MPS2369	.25	2N4402	.25
2N2484	.25	2N4403	.25
2N2905	.50	2N4857	1.00
2N2907	.25	PN4916	.25
PN2907	.13	2N5086	.25
2N3055	.79	PN5129	.25
3055T	.69	PN5139	.25
2N3393	.30	2N5209	.25
2N3414	.25	2N6028	.35
2N3563	.40	2N6043	1.75
2N3565	.40	2N6045	1.75
PN3565	.25	MPS-A05	.25
MPS3638	.25	MPS-A06	.25
MPS3640	.25	MPS-A13	.40
PN3643	.25	MPS-A55	.25
PN3644	.25	MPU-131	.99
MPS3704	.15	TIP29	.65
MPS3706	.15	TIP31	.75
		TIP32	.79

IC SOCKETS

	1-99	100
8 PIN ST	.13	.11
14 PIN ST	.15	.12
16 PIN ST	.17	.13
18 PIN ST	.20	.18
20 PIN ST	.29	.27
22 PIN ST	.30	.27
24 PIN ST	.30	.27
28 PIN ST	.40	.32
40 PIN ST	.49	.39
64 PIN ST	4.25	CALL

ST=SOLDERTAIL

8 PIN WW	.59	.49
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80

WW=WIREWRAP

INTERFACE

8T26	1.59
8T28	1.98
8T95	.89
8T96	.89
8T97	.89
8T98	.89
DM8131	2.95
DP8304	2.29
DS8833	2.25
DS8835	1.99
DS8836	.99
DS8837	1.65
DS8838	1.30

INTERSIL

ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	3.95
ICM7207A	5.59
ICM7208	15.95

DATA AQC

ADC0800	15.55
ADC0804	3.49
ADC0809	4.49
ADC0816	14.95
ADC0817	9.95
ADC0831	8.95
DAC0800	4.49
DAC0806	1.95
DAC0808	2.95
DAC1020	8.25
DAC1021	7.95
DAC1022	5.95
MC1408L6	1.95
MC1408L8	2.95

EXAR

XR2206	3.75
XR2207	3.75
XR2208	3.75
XR2211	5.25
XR2240	3.25

9000

9304	.95
9316	1.00
9328	1.49
9334	2.50
9368	3.95
9401	9.95
9601	.75
9602	1.50
9637	2.95
96S02	1.95

SOUND CHIPS

76477	3.95
76488	5.95
76489	8.95
SSI-263	39.95
AY3-8910	12.95
AY3-8912	12.95
MC3340	1.49
SP1000	39.00

OPTO-ISOLATORS

4N26	1.00	MCA-7	4.25
4N27	1.10	MCA-225	1.75
4N28	.69	IL-1	1.25
4N33	1.75	ILA-30	1.25
4N35	1.25	ILQ-74	2.75
4N37	1.25	H11C5	1.25
MCT-2	1.00	TIL-111	1.00
MCT-6	1.50	TIL-113	1.75

VISA MasterCard

MICRODEVICES AT MICROPRICES

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DB25S RS232 FEMALE SOLDER CUP 2.25

DB25P RS232 MALE SOLDER CUP 1.90

BARGAIN HUNTERS CORNER

2 LEVEL WIRE WRAP SOCKETS

THESE SOCKETS HAVE .50" LEADS. JUST A LITTLE SHORTER THAN THAN THE STANDARD 3 LEVEL WIRE WRAP SOCKETS WITH .67" LEADS.

	1-99	100-UP
8 PIN WW-2	.40	.35
14 PIN WW-2	.45	.39
16 PIN WW-2	.45	.39
20 PIN WW-2	.75	.59
22 PIN WW-2	.50	.39
24 PIN WW-2	.89	.75
28 PIN WW-2	.89	.75
40 PIN WW-2	.99	.89

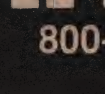
SPECIALS END 1/31/85

HARD TO FIND "SNAPABLE" HEADERS

Can easily be snapped apart to make any size header, all with .1" centers

1x36	STRAIGHT LEAD	.99
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

SHORTING BLOCKS



SPACED AT .1" CENTERS
IDEAL FOR DISK DRIVES
OR ANY .1" HEADER

5/1.00

DIP SWITCHES

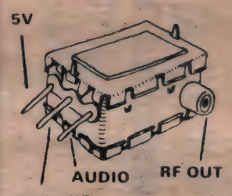
4 POSITION	.85
5 POSITION	.90
6 POSITION	.90
7 POSITION	.95
8 POSITION	.95
10 POSITION	1.29

RF MODULATOR (ASTEC UM1082)

QUANTITIES LIMITED

- PRESET TO CHANNEL 3
- USE TO BUILD TV-COMPUTER INTERFACE
- 5 VOLT OPERATION

$6.95



EDGECARD CONNECTORS

S-100 ST	S-100	3.95
S-100 WW	S-100	4.95
72 PIN ST		6.95
72 PIN WW		7.95
62 PIN ST	IBM PC	4.95
50 PIN ST	APPLE	4.95
44 PIN ST		2.95
44 PIN WW		4.95

36 PIN CENTRONICS

IDCEN36	RIBBON CABLE MALE	8.95
IDCEN36 F	RIBBON CABLE FEMALE	8.95
CEN36	SOLDER CUP MALE	7.95

EMI FILTER

- MAJOR MANUFACTURER
- LOW COST
- FITS LC-HP BELOW

$4.95

LINE CORDS

LC-2	2 CONDUCTOR 6 ft	.39
LC-3	3 CONDUCTOR 6 ft	.99
LC-HP	3 CONDUCTOR WITH STANDARD FEMALE SOCKET 6 ft	1.49
LC-CIR	CIGARETTE LIGHTER PLUG WITH 6 ft COILED CORD	2.95

MUFFIN FANS

4.68" SQUARE	14.95
3" SQUARE	14.95

RESISTORS

¼ WATT 5% CARBON FILM
ALL STANDARD VALUES
FROM 1 OHM TO 10 MEG OHM

50 PIECES SAME VALUE	.025
100 PIECES SAME VALUE	.02
1000 PIECES SAME VALUE	.015

BYPASS CAPS

.01 µf DISC	100/$6.00
.01 µf MONOLITHIC	100/$12.00
.1 µf DISC	100/$8.00
.1 µf MONOLITHIC	100/$15.00

DIODES

1N751	5.1 VOLT ZENER	.25
1N759	12.0 VOLT ZENER	.25
1N4148	(1N914)SWITCHING	25/1.00
1N4001	50PIV 1A	12/1.00
1N4004	400PIV RECTIFIER	10/1.00
1N5402	200PIV 3A	.25
KBP02	200PIV 1.5A BRIDGE	.45
KBP04	400PIV 1.5A BRIDGE	.55
MDA801	50PIV 12A BRIDGE	1.39
MDA980-1	50PIV 12A BRIDGE	1.95
MDA980-2	100PIV 12A BRIDGE	2.25
VM48	DIP-BRIDGE	.35

CAPACITORS

TANTALUM

1.0µf	15V	.40	.47µf	35V	.50
6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	560	50V	.05
22	50V	.05	680	50V	.05
25	50V	.05	820	50V	.05
27	50V	.05	.001µf	50V	.05
33	50V	.05	.0015	50V	.05
47	50V	.05	.0022	50V	.05
56	50V	.05	.005	50V	.05
68	50V	.05	.01	50V	.07
82	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	4.7	16V	.14
4.7	50V	.15	10	16V	.14
10	50V	.15	10	50V	.16
47	35V	.18	22	16V	.14
100	16V	.18	47	50V	.20
220	35V	.20	100	15V	.20
470	25V	.30	100	35V	.25
2200	16V	.60	220	25V	.30
			330	16V	.40
COMPUTER GRADE			550	16V	.42
			1000	16V	.60
			2200	16V	.70
44,000µf 30V 3.95			6000	16V	.85

LED DISPLAYS

HP5082-7760	CC	.43"	1.29
MAN-72	CA	.3"	.99
MAN-74	CC	.3"	.99
FND-537(359)	CC	.375"	1.25
FND-500(503)	CC	.5"	1.49
FND-507(510)	CA	.5"	1.49
TIL-311 4x7 HEX W LOGIC		.270"	9.95

HEAT SINKS

TO-220	SCREW ON	.35
TO-220	CLIP ON	.35
TO-3	SCREW ON	.95
TO-220	INSULATOR	10/1.00
TO-3	INSULATOR	10/1.00

SWITCHES

SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
BCD OUT 10 POSITION 6 PIN DIP		1.95

DIFFUSED LEDS

		1-99	100-up
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.18	.15
JUMBO YELLOW	T1¾	.18	.15
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09
MINI GREEN	T1	.18	.15
MINI YELLOW	T1	.18	.15
RECT RED	2x5mm	.25	.22
RECT GREEN	2x5mm	.30	.27
RECT YELLOW	2x5mm	.30	.27

DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.99	.99	.99	1.69	1.89	1.89	1.99	2.49	2.99
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

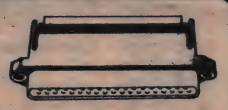
FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW

D-SUBMINIATURE

DESCRIPTION		ORDER BY	CONTACTS				
			9	15	25	37	50
SOLDER CUP	MALE	DBxxP	1.19	1.59	1.90	2.85	4.25
	FEMALE	DBxxS	1.50	1.85	2.25	3.90	5.25
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.65	2.20	3.00	4.83	---
	FEMALE	DBxxSR	2.18	3.03	3.00	6.19	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.95	3.90	4.75	6.95	---
	FEMALE	IDBxxS	3.25	4.29	5.25	7.95	---
HOODS	BLACK	HOOD-B	---	---	.99	---	---
	GREY	HOOD	.89	.99	.99	1.09	1.19

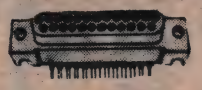
MOUNTING HARDWARE-$1.00

FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW



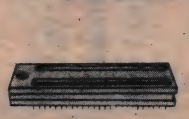
IDB37S

DB37S



DB25SR

TEXTOOL ZERO INSERTION FORCE SOCKETS AND RECEPTACLES



SCREWDRIVER CLAMP ECONO ZIF

LEVER CLAMP ZIF SOCKET

WW RECEPTACLES ZIF RECEPTACLE

TYPE	CONTACTS				
	14	16	24	28	40
ECONO ZIF	---	4.95	6.75	7.75	9.95
ZIF SOCKET	4.95	4.95	5.95	6.95	9.95
ZIF RECEPTACLE	8.25	8.75	9.75	10.50	12.75

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

ORDERING INSTUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED. EXAMPLE: A 10 PIN RIGHT ANGLE HOLDER STYLE WOULD BE IDH10SR

IDH20WR

IDE50

RIBBON CABLE

CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.83	7.30
16	.28	2.50	1.00	8.80
20	.36	3.20	1.25	11.00
25	.45	4.00	1.32	11.60
26	.46	4.10	1.32	11.60
34	.61	5.40	1.65	14.50
40	.72	6.40	1.92	16.80
50	.89	7.50	2.50	22.00

JDR Microdevices
1224 S. Bascom Avenue, San Jose, CA 95128
800-538-5000 • 800-662-6279 (CA) • (408) 995-5430
FAX (408) 275-8415 • Telex 171-110

RETAIL STORE - 1256 S. BASCOM AVENUE
HOURS: M-W-F, 9-5 TU-TH, 9-9 SAT, 10-3

PLEASE USE YOUR CUSTOMER NUMBER WHEN ORDERING

TERMS: Minimum order $10.00. For shipping and handling include $2.50 for UPS Ground and $3.50 for UPS Air. Orders over 1 lb. and foreign orders may require additional shipping charges - please contact our sales department for the amount. CA. residents must include 6% sales tax. Bay Area and LA residents include 6½%. All merchandise is warranted for 90 days unless otherwise stated. Prices are subject to change without notice. We are not responsible for typographical errors. We reserve the right to limit quantities and to substitute manufacturer. All merchandise subject to prior sale.

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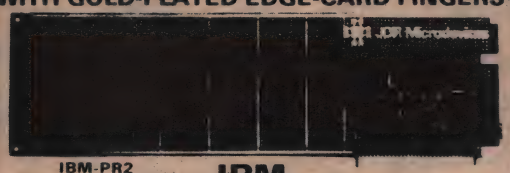
IBM PC PROTOTYPE CARD WITH DECODING CIRCUITRY $29.95

WIRE WRAP PROTOTYPE CARDS

FR-4 EPOXY GLASS LAMINATE WITH GOLD-PLATED EDGE-CARD FINGERS



IBM-PR2

IBM

BOTH CARDS HAVE SILK SCREENED LEGENDS AND INCLUDES MOUNTING BRACKET

IBM-PR1	WITH +5V AND GROUND PLANE	$27.95
IBM-PR2	AS ABOVE WITH DECODING CIRCUITRY	$29.95

S-100

P100-1	BARE - NO FOIL PADS	$15.15
P100-2	HORIZONTAL BUS	$21.80
P100-3	VERTICAL BUS	$21.80
P100-4	SINGLE FOIL PADS PER HOLE	$22.75

APPLE

P500-1	BARE - NO FOIL PADS	$15.15
P500-3	HORIZONTAL BUS	$22.75
P500-4	SINGLE FOIL PADS PER HOLE	$21.80
7060-45	FOR APPLE IIe AUX SLOT	$30.00

GENERAL PURPOSE

22/44 PIN EDGE-CARD (.156" SPACING)

P441-1	BARE - NO FOIL PADS 4.5" x 6.0"	$9.45
P441-3	VERTICAL BUS 4.5" x 6.0"	$13.95
P441-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P442-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P442-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P442-4	SINGLE FOIL PADS 4.5" x 9.0"	$13.50

36/72 PIN EDGE-CARD (.1" SPACING)

P721-1	BARE - NO FOIL PADS 4.5" x 6.0"	$9.45
P721-3	VERTICAL BUS 4.5" x 6.0"	$13.25
P721-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P722-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P722-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P722-4	SINGLE FOIL PADS 4.5" x 9.0"	$15.15

BARE GLASS BOARDS

NO EDGE-CARD FINGERS OR FOIL

P25x45	2.5" x 4.5"	$2.40
P45x65	4.5" x 6.5"	$4.70
P45x85	4.5" x 8.5"	$6.20
P45x170	4.5" x 17.0"	$11.35
P85x170	8.5" x 17.0"	$18.95

EXTENDER CARDS

IBM	$45.00
APPLE	$45.00
MULTIBUS	$86.00

DISK DRIVES

TANDON

TM 100-1 5¼" (FOR IBM) SS/DD	$199.00
TM 100-2 5¼" (FOR IBM) DS/DD	$199.95

MPI

MPI-B52 5¼" (FOR IBM) DS/DD	$139.95

TEAC

FD-55B ½ HEIGHT DS/DD	$139.95
FD-55F ½ HEIGHT DS/QUAD	$200.00

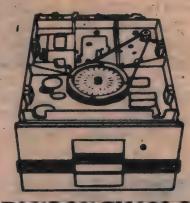
TEAC FD-55B

SHUGART

SA 400L 5¼" (40 TRACK) SS/DD	$199.95
SA 460 5¼" (80 TRACK) DS/QUAD	$199.95

8" DISK DRIVES

FD100-8 BY SIEMENS, SHUGART 801 EQUIV. SS/DD 10/$129.95 ea.	$149.95
FD200-8 BY SIEMENS, SHUGART 851 EQUIV. DS/DD 10/$185.00 ea.	$195.00



TANDON TM100-2

JFORMAT-2 $49.95
SUPPORT FOR QUAD DENSITY DRIVES FROM TALL TREE SYSTEMS

PLEASE INCLUDE SUFFICENT AMOUNT FOR SHIPPING ON ABOVE ITEMS

DISK DRIVE CABINETS

CABINET #1 $29.95
- Fits one full height 5¼"disk drive
- Color matches Apple

CABINET #2 $79.00
- Fits one full height 5¼"disk drive
- Complete with power supply, switch, line cord, fuse and standard power connector
- Please specify Grey or Tan

CABINET #3 $89.95
- Fits two half height 5¼"disk drives
- Complete with power supply, switch, line cord, fuse and standard power connectors

8" DISK DRIVE CABINETS ALSO AVAILABLE-PLEASE CALL

PLEASE INCLUDE SUFFICIENT AMOUNT FOR SHIPPING ON ABOVE ITEMS

SWITCHING POWER SUPPLIES

PS-IBM $175.00
- FOR IBM PC-XT COMPATIBLE
- 130 WATTS
- +5V @ 15A, +12V @ 4.2A -5V @ .5A, -12V @ .5A
- ONE YEAR WARRANTY

PS-A $49.95
- USE TO POWER APPLE TYPE SYSTEMS
- +5V @ 4A, +12V @ 2.5A -5V @ .5A, -12V @ .5A
- APPLE POWER CONNECTOR

PS-3 $39.95
- AS USED IN APPLE III
- +5V @ 4A, +12V @ 2.5A -5V @ .25A, -12V @ .30A,
- 15.5" x 4.5" x 2", .884 LBS.

PS-TDK $59.95
- +5V @ 5A, +12V @ 2A +12V @ 2.8A, -12V @ .30A
- 6.2" x 7.4" x 1.7", 1.6 LBS.

OK INDUSTRIES

EX-1 IC EXTRACTION TOOL

- ONE PIECE METAL CONSTRUCTION
- EASILY EXTRACTS 8-24 PIN DEVICES
- LOW COST $2.19

EX-1

EX-2 IC EXTRACTION TOOL

- EXTRACTS 24-40 PIN DEVICES
- HEAVY DUTY METAL CONSTRUCTION
- GROUND LUGS FOR MOS EXTRACTIONS
- EASY ONE HAND OPERATION $12.74

IC INSERTION TOOLS

INS-1416	for 14-16 pin IC's	$5.15
MOS-1416	for 14-16 pin IC's	$10.92
MOS-2428	for 24-28 pin IC's	$10.92
MOS-40	for 40 pin IC's	$12.43

MOS series insertion tools have metal constuction and include grounding lug for CMOS applications.

INS-1416 INS-2428

BW-630 WIRE WRAP GUN

- BATTERY POWERED-USES 2 NI-CAD C CELLS(NOT INCLUDED)
- POSITIVE INDEXING
- ANTI-OVERWRAP DEVICE $41.55

BW-630

WSU-30 WIRE WRAP TOOLS

- WRAPS, STRIPS, AND UNWRAPS
- WSU-30M WRAPS AN EXTRA TURN OF INSULATION

WSU-30 $8.84/WSU-30M $10.14

WSU-30 30M

WIRE WRAP TERMINALS

WWT-1	SLOTTED	25/$7.06
WWT-2	SINGLE SIDED	25/$4.25
WWT-3	IC SOCKET	25/$7.06
WWT-4	DOUBLE SIDED	25/2.80
INS-1	INSERTION TOOL	$3.64

WIRE DISPENSER

- WITH 50' ROLL OF WIRE
- BUILT IN PLUNGER CUTS WIRE
- BUILT IN STRIPPER STRIPES 1"
- REFILLABLE

WD-30 $6.50 Specify Blue, white, Yellow or Red

WD-30TRI $9.50 With 50' of each: Red, Blue and White

SOCKET-WRAP I.D.™

- SLIPS OVER WIRE WRAP PINS
- IDENTIFIES PIN NUMBERS ON WRAP SIDE OF BOARD
- CAN WRITE ON PLASTIC; SUCH AS IC #

PINS	PART#	PCK. OF	PRICE
8	IDWRAP 08	10	1.95
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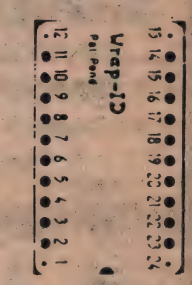

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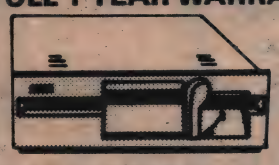

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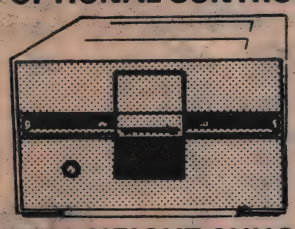

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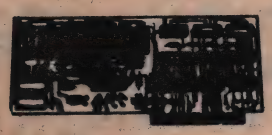

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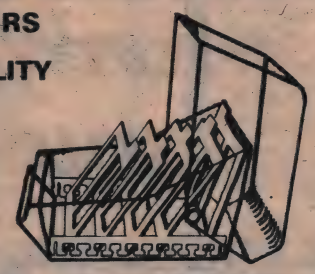

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Commodore Reviews Continued from page 102

horseback, by ship, by plane, or by rocket. Riding horseback only requires having enough gold to buy a horse. All the other ways of getting around are more complicated, usually you must own some particular treasure or artifact. You may also need to be specially attired.

Of course, there are all kinds of mean and nasty travelers to meet along the way. Most of them must be outfought or outrun. Some have magic to help them defeat you. Beware of thieves, who will steal any treasures they can from you. Defeating baddies is the only way to gain experience and get more gold.

There are towns and cities, where aid and comfort can be found provided you have sufficient gold. Guards discourage antisocial behavior (such as fighting and stealing) while in the limits of their jurisdiction. Since they are quite strong, it isn't a good idea to mess with them. Their idea of offender control consists of beating the miscreant to death or the edge of town, whichever comes first.

Information can be ferreted out in town. The bartender at the local pub is a great source of gossip. He'll pour you a drink, or, for an appropriate tip, drop some info. Sort of a tips for tips, arrangement. Citizens you meet may drop a clue or two for a friendly word. Or oracles for hire may provide useful information (for a price).

Food is a constant necessity for an adventuring soul, so stock up while you're in civilized territory. You won't find any lying around the countryside and starvation is an uncomfortable way to die.

The Ultima II universe also has dungeons and towers peopled with monsters. Hidden within are more treasures and possible clues to solving the riddle of Minax, the evil sorceress who must be defeated to win the game.

This program has marvelous graphics, great sound, and a fascinating game scenario. The programmers should be congratulated on a wonderful job. They have thought of everything, including a pause feature so you can grab a sandwich when screen displayed food isn't enough. The programmers show a unique sense of humor, that vastly improves the game. A frustration vent has even been provided in the form of two frivalous commands, jump and yell.

By the way, this review was done on the Commodore 64

Continued on page 110

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Commodore Reviews Continued from page 109

version, which was rewritten for that machine by Bobbit! The original was programmed by Lord British, whose alter ego resides in a castle on an island that resembles England in the Ultima II universe. He is a most helpful individual, so make plans to visit him often.

The documentation is a work of art. Good illustrations. Informative, without giving the whole game away. The author, Mary Taylor Rollo, shows unusual creativity in avoiding the boring manual that could have wrecked a marvelous game. The player reference card that lists the available commands is a real godsend when you get yourself into a corner and can't remember what to do to get out.

Although I've had the game for a couple of months and have spent numerous days playing it, it hasn't come anywhere close to getting old. There is still so much left to be explored. My best character has gotten to level 26 and nowhere near winning, yet.

Ultima II is a game for older children and adults. Younger children would find it overwhelming. Others will no doubt find it addicting. Be careful about scheduling your first session when you have something important to do in a few hours. Although the program has a save and restore feature, it's easy to lose track of time. You know what they say about time flying when you're having fun. With Ultima II, days fly.

Muppet Learning Keys

Muppet Learning Keys
Koala Technologies, Inc.
3100 Patrick Henry Drive
Santa Clara, CA 95052-8100
(408) 986-8866

Suggested Retail: $79.95

Available for the Apple IIe and IIc, Commodore 64 and the Atari computers.

Every now and then a product comes along that I really love and this one qualifies. (Must be the child in me.) The Muppet Learning Keys package has a delightful keyboard arranged in a fashion young children will be comfortable with. The software that comes with it is instructive, entertaining and simple to use.

Muppet Learning Keys is a collaboration between engineers at Koala, software writers at Sunburst Communications and Henson Associates, the creators of Kermit the Frog, Fozzy Bear and their other muppet friends. And everyone involved seems to have done their part right.

Well, almost. The only thing I could fault them for was underestimating the children of today. My two year old loves to play with her "Muppets," but Koala recommends the keypad for children ages 3 and up. My neighbor's two and half year old also enjoys playing with it, so I think that Koala was being a bit cautious in their estimations. I wouldn't recommend allowing children younger than three to play unsupervised, until they've demonstrated that they can handle it.

Getting the keyboard set up and loading the software is not a difficult task, but it does take a while (approximately five minutes.) The younger children will need their parents to oversee this operation, since the initial commands must be loaded using the regular keyboard. But once the software has loaded, a few simple instructions are all that's needed for the child to start learning.

The Muppet Learning Keys have been designed to put most of the computer's functions right at the child's fingertips. The 3/4" square alphabetic characters are much easier to read than those on a normal keyboard. The numbers 0-9 are on a ruler at the top. Below these are a paint box with keys representing the eight colors normally contained in a kindergarten crayon box. Below this, the letters are arranged in alphabetic order.

Arrow keys are arranged like compass points at the side, while below them four illustrated function keys give kids additional options. Miss Piggy graces a key marked "HELP," Gonzo portrays "OOPS," Kermit whizzes by on his bike to illustrate "GO" and Fozzy Bear holds a "STOP" sign. There are also keys for a space and for arithmetic operations (+, −, x, /, and =). An eraser is provided, as well as an escape (labeled ZAP).

The software that is provided makes good use of home computer graphics capabilities. The three programs that come with the Commodore version are excellent. One configures the keyboard to react in predictable ways to keys being pressed. Pressing a letter will display some object whose first letter corresponds to the letter pressed. For instance, "A" displays an alligator. By pressing a number key, the appropriate number of alligators would appear. Pressing a color in the paint box, at this point would change all the alligators to that color. Then, pressing the GO key would cause the alligators to dance to the tune of "Camptown Races." Pressing the arrow keys causes arrows pointing in the appropriate direction to appear on the screen. In this mode, all the keys on the keyboard do something to change the screen display whenever they are pressed.

The second program displays a backdrop of columns on the screen with a picture representing one of the letters on the foremost pedestal. When the letter key that corresponds to the initial letter of the picture is pressed, the picture reacts as it does when in GO mode of the first program, i.e. the ostrich sticks it's head in the sand, or the camel walks. A wrong choice makes a not too unpleasant beep.

The third program divides the screen into nine equal size sections. The words "HOW MANY?" appear at the bottom and the program fills in some of the squares with pictures. For instance, eight camels. You can probably guess what comes next. Choose the right number and all the birds sing. Choose the wrong number and it beeps.

These three programs are

Continued on page 111

Muppet Learning Keys by Koala Technologies, Inc.

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Commodore Reviews
Continued from page 110

marvelous for pre-schoolers because they are simple and easy to understand. Score isn't kept nor are nasty messages given. Just good old positive reinforcement, with an open invitation to try again if a wrong guess is made.

The documentation is very well written. Clear and concise, but entertaining and aimed at the audience it is meant for; kids. The Muppet characters invite the young user to get involved and explain everything in simple terms. The illustrations are attractively designed. Sending your warranty card back will get you a cute alphabet poster with all the letter illustrations in vibrant colors.

Koala promises more learning games designed for children of various ages. Since there is no information on how to customize your own programs to work with the keypad, you will have to depend on third party vendors for other uses of the product. Hopefully this will change sometime soon. But even if it doesn't, this is a nice package that will get children interested in playing with a computer.

To give you some idea of the life span of these programs, my daughter has been playing the letters game for two weeks now. She's got all the letters down and is looking for something more challenging. She is beginning to understand the numbers game and since she can already count to ten, I expect her to quickly grow tired of it. Help Koala, we need more programs! ●

Book Review

The Home Computer Wars
by Michael Tomczyk

Published by
Compute! Books, $9.95
Reviewed by Stan Veit

Mike Tomczyk was Jack Tramiel's assistant for four years at Commodore and a loyal "Commodorian."

He is uniquely qualified to write the story of Commodore and its leadership in the home computer field. The Home Computer Wars were largely the invention of Jack Tramiel who viewed business as a form of war against competition. He waged this war against Texas Instrument and Atari defeating both these companies who had vastly greater assets than Commodore. Mike Tomczyk tells the story of how Jack Tramiel waged this war on two fronts. First, against the competing home computer manufacturers and secondly, against those within Commodore who did not share the "Religion"—which was Jack's dream of bringing computers "to the masses, not the classes."

To one who has been a Commodore watcher since the first announcement of the PET, I found this book a storehouse of information about why things happened that I could never figure out. For example, as owner of Computer Mart of New York I never knew why our store, the largest in New York City, could not become a Commodore dealer until I met Jack at a computer show and spoke to him about it. We were made a Commodore dealer a week later. Mike reveals how Tramiel cracked down on executives who had interests in computer stores and kept competition away from their stores. This may have been the case in the New York area. This is just one of the mysteries about Commodore that Tomczyk relates in his well written book. There are many more, such as the reasons for "The President of the Month Club;" the reason why Commodore announced so many products that never reached the market; the software that appeared and then disappeared from the market; the lawsuits between Chuck Peddle, Commodore's ace designer and the company and why Chuck Peddle left the company and then returned before starting his own company.

Most important, Mike also tells why Jack Tramiel left Commodore at a time when he had driven Texas Instruments from the home computer market, defeated Atari and kept the Japanese out of the market for two years.

Mike Tomczyk was closely associated with the development of the VIC-20 and he devotes a lot of space in his book to the fight to bring this low cost computer to the market at a price of $300 or less. The "experts" at Commodore were opposed to the VIC-20, particularly Chuck Peddle. The VIC was too small, it did not have enough memory for any practical application, there was no margin of profit possible in such a cheap computer. There were hundreds of reasons why the VIC should never be built. Jack had the answer to all these reasons. "The Japanese are coming. We will be the Japanese." He knew that the Japanese were about to introduce computers below the lowest prices in the US that ran from $600 to $800. Jack knew that he could throw their planning off by bringing in a starter computer at $300. It worked.

Continued on page 112

The Print Shop For C-64

Broderbund Software is releasing the Commodore 64 version of their current best seller, The Print Shop. The program was first released for the Apple // family of computers at the end of May and quickly rose to the top of many home software charts.

The Print Shop enables you to write, design, and print your own greeting cards, stationary, letterhead, signs and even banners. Designed to be easy and fun, the program doesn't require talent or special knowledge of computer graphics.

The Print Shop will produce, with one pass through your printer, a greeting card that has both an inside and outside message. You even have the opportunity to give yourself credit on the backside. Text-editing features such as automatic centering and left and right justification, make it easy for you to create an attractive card.

The Print Shop also allows you to produce a custom-designed letterhead complete with a personalized logo. Full-page signs with graphics can be created in a minute. Or print out your text and graphics horizontally to create a banner of unlimited length.

The Print Shop is menu driven and highly visual. By simply choosing and arranging the various elements of your message, you can produce a finished, original piece in a matter of minutes.

Eight different typestyles are available in multiple sizes and in solid, outline and three-dimensional formats. There are nine border designs, ten abstract patterns, and dozens of pictures and symbols with which to create personalized messages for any purpose or occasion.

A built-in Graphic Editor lets you create original pictures and symbols or modify those already provided. You can also freeze and print designs from 12 kaleidoscopic animations provided.

As an introductory bonus, The Print Shop comes complete with a colorful assortment of pin-feed paper and matching envelopes. The Print Shop also includes an illustrated manual and reference card.

The Commodore 64 version supports many popular printers, including Epson, Star Micronics 10X and 15X, Legend 880, Panasonic KX-P1090/1091, Blue Chip, Mannesmann Tally Spirit 80, C.Itoh Prowriter, NEC 8023A, Okidata 92/93 and Commodore VIC-1525 and MPS-801 printers. The suggested retail price is $44.95. An Atari computer version of the program will also be available.

A supplemental disk, The Print Shop Graphics Library Disk 1, with 120 additional designs will be available for The Print Shop owners for $24.95.

For more information, contact Broderbund Software, 17 Paul Drive, San Rafael, CA 94903.

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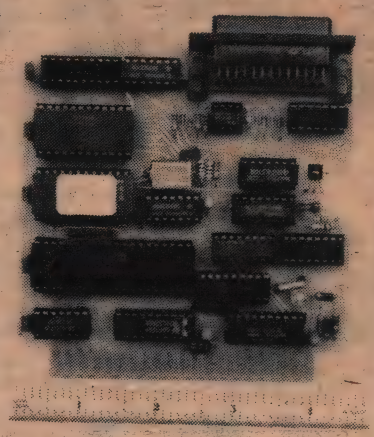

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Book Review
Continued from page 111

The VIC-20 and its big brother the Commodore 64 started the home computer wars and the resulting price cutting kept the US market in such confusion that the Japanese stayed out of the low end computer market in the US. Jack Tramiel even did better than that; he carried the fight to Japan itself by introducing the VIC in Japan as the VC 1001. In addition, he never gave the Japanese a sitting target. He kept introducing new products, most of which never went into production, and kept cutting prices on the VIC 20 and C 64.

In addition to his work with the VIC-20, Mike had the function of contact with magazine editors. He was the only person at Commodore that would, or could give, an editor a straight answer. His answers were often "I don't know but I will try to find out," or "I can't tell you about that," but he never gave you the run-around that was common at Commodore. I would develop a contact at Commodore who I hoped would keep me informed of what was happening in this important company. The next time I called my new contact I would be told, "he doesn't work here anymore." Mike was always somewhere in Commodore and if you could find him, he would try to help you. In this book he finally gives us the answers that he couldn't tell us about. Mike has followed the exodus of the Commodorians from Commodore now and is missed by all magazine editors and writers.

If you are a "Commodorian," I would suggest that you buy this book; it is almost as important in understanding the development of your computer as the vital "Commodore 64 Reference Manual." ●

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The Music Shop — A Composer And Synthesizer For C-64

The Music Shop, Broderbund Software's music composing program, is designed to be useful and fun for everyone from an accomplished musician to those who've never played a note of music in their lives.

The Music Shop, which is being released initially for the Commodore 64, performs two kinds of functions. As a music composition tool, it lets you create, store and edit compositions and print out professional-looking sheet music. As a music synthesizer, it lets you control the Commodore 64's musical capabilities to lend a wide range of sound textures to your melodies.

The Music Shop features:

- Macintosh-like user interface with easy-to-use pull-down menus, windows and dialog boxes you control using keyboard or joystick.
- Legible on-screen musical notation. The program keeps the music before your eyes a page at a time, then automatically "turns" to the next page as the music plays, with no hard-to-read scrolling. Each piece can be up to 20 pages in length.
- Editing made simpler with commands borrowed from word processing. For example, you can cut, paste or copy whole sections of music.
- Broad musical capabilities. For example, you can write—and accurately play back—whole notes to 32nd notes, dotted notes, ties and triplets in eight time signatures.

Suggested retail price for The Music Shop is $44.95. Subsequent versions will be available for the Apple Macintosh and IBM PCjr.

For more information, contact Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101.

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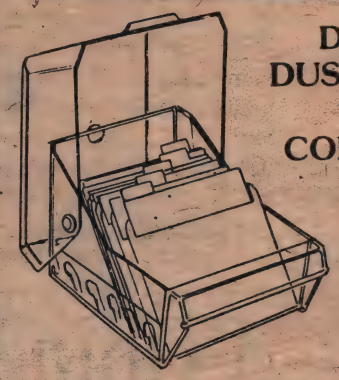

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ATARI

Applying The Atari

by Jeff Brenner

This month we've got an interesting test/study program for students and teachers. We'll also look into January's banner program, reader mail and DOS 3, plus I'll reveal Atari's new address. But first let's see what has been going on in Sunnyvale, CA.

Atari News

$119.95—that's the retail price of the Atari 800XL announced by Jack Tramiel in the midst of the holiday buying season. That's quite an unbelievable price (several years ago, a 48K Atari 800 would have cost over ten times the amount) and I would find it even more unbelievable if Atari were actually making money from them.

The Atari people tell us that the price break is the result of "lower production costs." Maybe, but let's look at the real situation that resulted in the dramatic price change: The data is November 1984. Atari is in debt—it seems like they owe millions to every company in the United States. While these companies are trying to quickly get their money from what they perceive to be a good Chapter 11 candidate, Jack Tramiel and his crew are drowning in unsold Atari 800XLs. So, Tramiel proudly announces his "$119.95 Atari 800XL" plan (or more accurately, his "quick-cash" plan), Commodore headquarters explodes in confusion and perspiration, and everybody runs out to get the lowest-priced 64K computer on the market.

Atari probably drew away a significant portion of sales from Commodore over the holiday season, but no one can really be sure. The new price had an even more important effect for Atari in that many retailers who had dropped their line resumed selling Atari products with the irresistible prices. This means that Atari might have a wider distribution network for its newer computers. Incidentally, we'll have complete information on Atari's new units as soon as it becomes available.

Programming Tips

Every few months I'll be printing a Programming Tips section in which useful hints and ideas sent in by readers will be listed. If you have any programming suggestions or short, handy programs from which others may benefit, send them in. If your idea is printed, I'll send you a three-dimensional laser-etched hologram sticker. Some of these fascinating stickers were produced under license from Atari when designers were attempting to develop a holographic video game.

Reader Mail

Please send me some literature pertaining to software for the Atari Home Computer 800. Software programs are limited here in Panama. Therefore, we must rely on computer supplies from companies abroad.

Candida B. Carteret
Panama—APO Miami

I am sending you a list of some Atari software distributors and manufacturers that sell to the public. Others who want this list should send a self-addressed stamped envelope. Your best bet is to write to these companies and request their catalogs. You also might want to make some contacts with Atari users groups in the United States. Many of these groups have public domain software which they trade or sell at inexpensive prices. Computer Shopper's "Users Groups" section has a generous listing of these groups.

I am trying to translate a short BASIC program into assembly language. My problem is that I cannot figure out how to translate a BASIC line such as "IF A>B THEN GOTO 100." I know I need to use a CMP and a branch statement, but I become confused with the carry bit. Both A and B are less than 256 so there is no need for comparisons greater than one byte. I am relatively new to assembly language, so any help you can give me would be greatly appreciated.

Bill Foster
Fayetteville, NC

The CMP operation compares the quantity following the CMP with the value in the accumulator. When one quantity is compared with another, the computer, in effect, subtracts one from the other, although neither quantity is actually changed. The result of this subtraction determines the combination of internal flags

Continued on page 114

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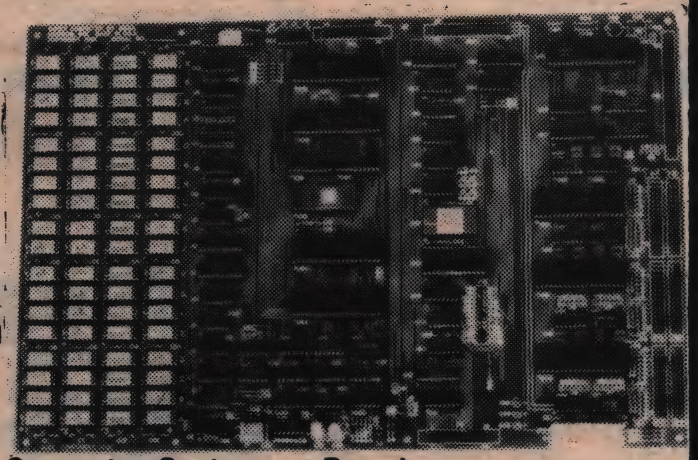

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Applying The Atari

Continued from page 113

that are set. If the two quantities are equal, the result of the subtraction is zero and the zero flag is set. Thus, a BEQ or BNE instruction causes the computer to refer to the zero flag to determine whether or not to branch.

What you need to be concerned with is the carry flag. When a larger quantity is compared to a smaller quantity, as in:

```
LDA #50
CMP #100
```

the carry bit is cleared. This condition can therefore be checked with the BCC, or Branch if Carry Clear, operand. On the other hand, when a smaller quantity is compared to an equal or larger quantity, as in:

```
LDA #100
CMP #50
```

or in:

```
LDA #100
CMP #100
```

the carry bit is set, and the condition can be checked with the BCS, or Branch if Carry Set, operand. Since the computer performs its own subtraction when comparing two quantities, these same carry flag rules apply when subtracting one quantity from another. Figure 1 gives sample IF-THEN statements and their assembly language equivalents.

IF-THEN
MACHINE LANGUAGE EQUIVALENTS

BASIC	ASSEMBLY
IF A>B THEN NUM (or IF B<A)	LDA #A CMP #B BCC NUM
IF A>=B THEN NUM (or IF B<=A)	LDA #A CMP #B BCS NUM

Figure 1

DOS 3

I finally received DOS 3 from Atari a few weeks ago and will be answering questions about it in the future. I purchased my 1050 drive months before DOS 3 was released and have been waiting for it ever since. Those of you who have a 1050 drive but do not have DOS 3, you're entitled to it. I managed to discover Atari's customer relations address, so write to them, tell them your drive's serial number, and ask for a copy:

ATARI CUSTOMER RELATIONS
390 Caribbean Drive
Sunnyvale, CA 94089
(408) 745-4851

Figure 2

Regarding DOS 3, many have questioned as to whether a DOS 3 disk can be converted to DOS 2. While it is possible to convert DOS 2 files into DOS 3 files (by selecting the ACCESS DOS 2 function), as of yet I know of no program to do the opposite. However, I see no reason why such a program cannot be produced. If any readers know of such a program or have developed one, tell us about it. Meanwhile, here is a simple solution for those of you who are reluctant to permanently "DOS 3" a program: Use DOS 3 to create your programs. When you want to change a DOS 3 program to a DOS 2 one, save the program to cassette. Then turn off the computer, boot up with DOS 2 and load the program from cassette. You can then save it on the DOS 2 disk. Let's hope a faster solution is available soon.

Banner Program Mystery

For those of you who have been wondering how January's 17-line banner program produces its characters, the mystery is hereupon solved. Observant individuals will have noticed that the characters look remarkably similar to those which appear on your Atari's screen. The reason is that the banner program actually uses the character data

Continued on page 116

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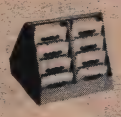

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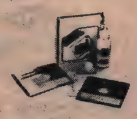

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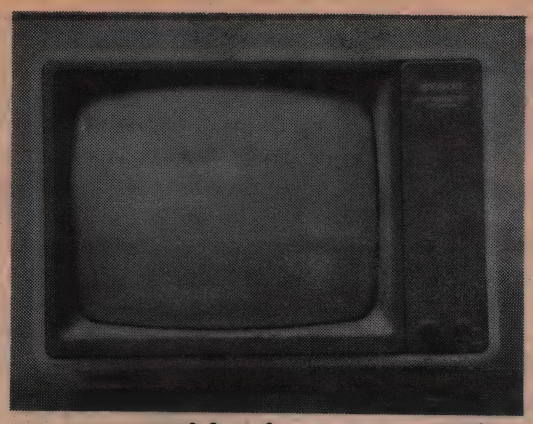

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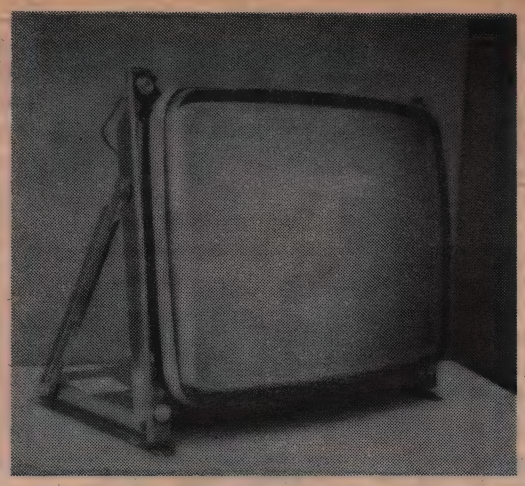

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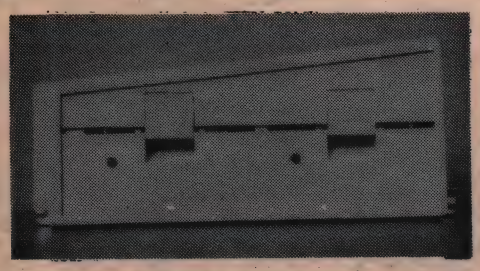

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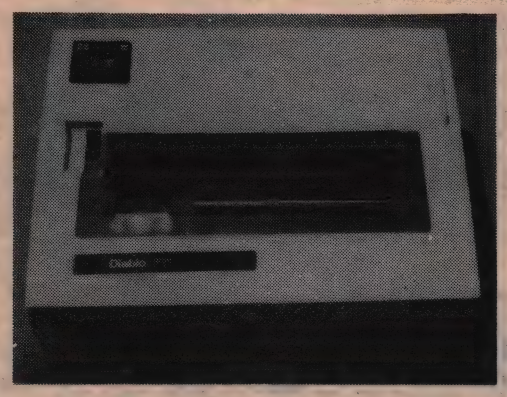

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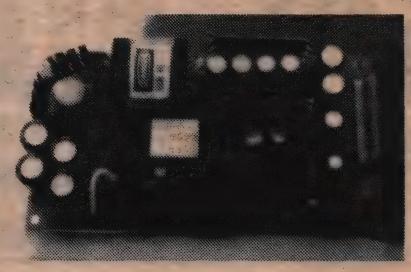

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Applying The Atari
Continued from page 114

uses to plot its characters. Now, that's clever! More on this topic in upcoming months.

Computer Assisted Study

Here's the program thousands of students across the country have been waiting for: A program designed to make studying more efficient and enjoyable. Teachers will find this program equally useful for teaching and testing purposes. The three-letter codes preceeding each program line are to be used with December's "Program Perfect," which checks for typing errors. If you do not have "Program Perfect" send me a SASE and request a listing.

This program is most effective with study material that can be arranged in question/answer form. Foreign languages, vocabulary, social studies facts, math formulas, and the like work excellently. It might be necessary, especially when studying foreign languages, to substitute another character for one not existing on the keyboard. For example, the Spanish word for music is MUSICA, with an accent over the "U." It can be entered into this program as "MU'SICA," with an apostrophe following the "U."

After you type in the Computer Assisted Study program, RUN it. A menu will be displayed with the following options:

ENTER NEW DATA
SAVE
LOAD
TEST
ADD DATA
CHANGE DATA
DISPLAY DATA
Enter New Data

When you first RUN this program, you will want to enter some study material. Press the "E" key. You are asked to enter question #1, and then answer #1. Enter a question you want to be asked when you are being tested. If you are entering a vocabulary list, you can just enter one of your vocabulary words. Press RETURN and then enter the answer. If you had typed in a vocabulary word as a question, then you would enter the definition as the answer.

Continue entering questions and answers until you reach a desired number of questions. You may enter up to 100 questions and answers, depending upon the amount of memory your Atari has. A 16K Atari will allow about 21 questions and answers. It is recommended that you test yourself on less than 30 at a time for the best effectiveness. After the last question and answer is entered, enter an asterisk "*" for the "QUESTION" prompt. This returns you to the menu.

Save

After you enter your study data, you can save it on a cassette or diskette. Press the "S" key to select the save option. When asked, specify

Continued on page 117

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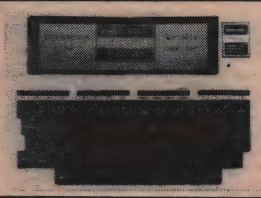

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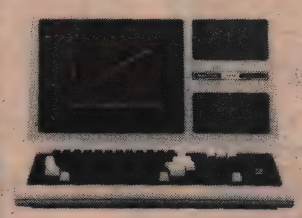

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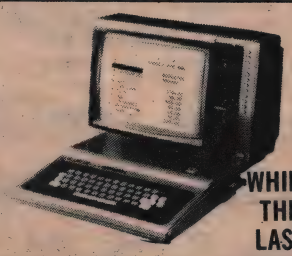

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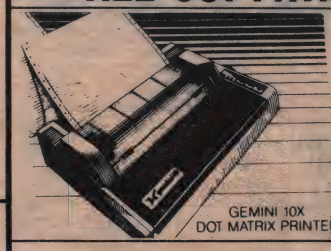

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Applying The Atari
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cassette or disk, and if using a disk, enter a file name. The data you entered previously is saved, and you are returned to the menu.

Load From Cassette/Disk

Whenever you wish to load a previously saved file, press "L." You can save files on all your subjects, and recall them at the end of the year to study for finals! As with the "Save" option, you must specify cassette or disk. If you are loading from disk, enter the name of the file you wish to load. When the file is loaded completely, you are returned to the main menu.

Test

After you enter your study material, press the "T" key. Now you will begin to study. One question is selected at a time from all that you entered. The questions are given in a random order; not in the order in which they were entered. You simply enter the correct answer to each question. If you answer correctly, the computer will print "CORRECT" and will continue with the next word. If, however, you do not enter the right answer, the computer will print "INCORRECT. CORRECT ANSWER:" followed by the answer you should have typed. One powerful feature of this program is that it will give you an incorrectly answered question again at a later time in the testing period. The question will continue to be given until it is correctly answered, thus impressing the answer in your mind. You are not additionally penalized, however, for getting the same question wrong more than once (to prevent negative scores). When all questions are correctly answered, a score is given. The score is the percentage of the number of questions answered correctly the first time given out of the total number of questions. The score allows you to see your progress and to determine how much more studying you need. A score above 90 is given an "EXCELLENT SCORE" reward. After the test is over, you are asked if you wish to take it again. You should continue retaking the test until you get a satisfying score.

Add Data

Press "A" on the menu screen when you want to add more questions and answers to the ones already in memory. Enter an asterisk when you finish entering the data.

Change Data

Press "C" when you wish to change a question or answer in memory. Enter the number of the question/answer that you wish to change. If you want to change the question, enter a "Y" for the "DO YOU WANT TO CHANGE THIS" prompt. To change the answer, enter an "N" for the first prompt, and a "Y" for the second. After a question/answer is changed, you are asked if you wish to make more changes. Enter "Y" to make more changes or "N" to return to the menu.

Display Data

Press "D" to see the data that is currently in memory. Each question and answer is displayed with its corresponding number. You can use this option to make sure the correct data was loaded from cassette or diskette, and to check for errors after material has been entered.

Final Notes

A good rule of thumb is to study the same material over a period of days. Of course, the more you try to study at once, the less effective your studying becomes.

"Isn't it cheating?" concerned parents and teachers might ask. No. Studying by computer is simply another alternative for a student. The material is actually learned, but can be done so in a shorter period of time due to an interest in studying with a computer.

Good luck with Computer Assisted Study. After using it, you might discover that studying does not have to be such a tedious, boring task.

Next Month

We'll have a software alarm clock, more reader mail and some surprises. Stay tuned.

Readers' questions, comments and contributions are welcome.

Address all correspondence to:
Jeff Brenner's
"Applying the Atari"
c/o Computer Shopper
P.O. Box F
Titusville, FL 32781 ●

```
FXJ 10 REM COMPUTER ASSISTED STUDY
EWJ 20 REM BY JEFF BRENNER
PAJ 30 N1=1:N2=N1+N1:N4=N2*N2:N8=N4*N2:N75=75:N76=N75+N1:N100=100:N152=N76*N2
WAJ 40 N151=N152-N1:FM=FRE(N0)-600:DIM A$(FM),I$(N100),QU$(N76),AN$(N76)
SQJ 50 DIM IN$(N76),NAME$(11),K$(11),TEST$(N100)
UVJ 60 OPEN #N1,N4,N0,"K:":I$(N100)=CHR$(N0):A$(FM)=CHR$(N0)
LGJ 70 GRAPHICS N0:POSITION N4,N0:PRINT " COMPUTER ASSISTED STUDY PROGRAM"
QSJ 80 POSITION N2,N4:PRINT "PRESS KEY:"
XEJ 90 PRINT :PRINT "ENTER NEW DATA":PRINT :PRINT "SAVE":PRINT :PRINT "LOAD"
AKJ 100 PRINT :PRINT "TEST":PRINT :PRINT "ADD DATA":PRINT :PRINT "CHANGE DATA"
JWJ 110 PRINT :PRINT "DISPLAY DATA":PRINT :PRINT ">";:GET #N1,K:PRINT CHR$(K)
FUJ 120 RESTORE 130:FOR I=N1 TO 7:READ T:IF T<>K THEN NEXT I:GOTO 70
LZJ 130 ON I GOTO 140,250,370,440,680,700,840:DATA 69,83,76,84,65,67,68
DFJ 140 GRAPHICS N0:PRINT "ENTER NEW DATA":IF NUM=N0 THEN GOTO 170
KXJ 150 PRINT "ERASE OLD DATA";:INPUT IN$:IF IN$(N1,N1)="N" THEN GOTO 70
XWJ 160 NUM=N0
IAJ 170 PRINT "CAN ENTER UP TO ";INT(FM/N152);" QUESTIONS."
QBJ 180 FOR D=NUM+N1 TO N100:I=D*N152-N151:PRINT :PRINT :PRINT
FQJ 190 IF FM-D*N152<N0 THEN PRINT "OUT OF MEMORY":NUM=D-N1:GOTO 920
IVJ 200 PRINT "QUESTION #";D;":":INPUT QU$:IF QU$="*" THEN NUM=D-N1:GOTO 70
HVJ 210 PRINT :PRINT "ANSWER #";D;":":INPUT AN$
OEJ 220 QU=LEN(QU$):AN=LEN(AN$)
PLJ 230 A$(I,I+QU)=QU$:A$(I+N76,I+N76+AN)=AN$
XIJ 240 I$(D*N2-N1)=CHR$(QU-N1):I$(D*N2)=CHR$(AN-N1):NEXT D
BKJ 250 GRAPHICS N0:PRINT "SAVE TO CASSETTE/DISK":GOSUB 950:PRINT
AQJ 260 GOSUB 270:GOTO 330
FDJ 270 PRINT "CASSETTE OR DISK>";:GET #N1,K:K$=CHR$(K):PRINT K$
YOJ 280 IF K$<>"C" AND K$<>"D" THEN PRINT CHR$(28);:GOTO 270
ITJ 290 IF K$="C" THEN NAME$="C:":GOTO 320
FZJ 300 POKE 764,255:NAME$="D:":PRINT "FILE NAME:";:INPUT K$
KHJ 310 NAME$(LEN(NAME$)+N1)=K$
AVJ 320 RETURN
AOJ 330 TRAP 360:OPEN #N2,N8,N0,NAME$
LNJ 340 PUT #N2,NUM:PRINT #N2;I$:FOR I=1 TO NUM*N152 STEP N76
RTJ 350 PRINT #N2;A$(I,I+N75):NEXT I:CLOSE #N2:GOTO 70
ADJ 360 CLOSE #N2:PRINT "SAVING ERROR #";PEEK(195):PRINT :GOTO 270
INJ 370 GRAPHICS N0:PRINT "LOAD FROM CASSETTE/DISK":PRINT :IF NUM=N0 THEN 390
LCJ 380 PRINT "ERASE OLD DATA";:INPUT IN$:IF IN$(N1,N1)="N" THEN GOTO 70
ENJ 390 GOSUB 270
AGJ 400 TRAP 430:OPEN #N2,N4,N0,NAME$
NPJ 410 GET #N2,NUM:INPUT #N2;I$:FOR I=N1 TO NUM*N152 STEP N76
LTJ 420 INPUT #N2;IN$:A$(I,I+N75)=IN$:NEXT I:CLOSE #N2:GOTO 70
CGJ 430 CLOSE #N2:PRINT "LOADING ERROR #";PEEK(195):PRINT :GOTO 390
QMJ 440 GRAPHICS N0:PRINT "TEST - ";NUM;" QUESTIONS/ANSWERS":GOSUB 950
MFJ 450 TEST$(N1)=CHR$(N0):TEST$(N100)=CHR$(N0):TEST$(N2)=TEST$
RBJ 460 WRONG=N0:D=N0
OBJ 470 RM=INT(RND(N0)*NUM)+N1:I=RM*N152-N151:IF TEST$(RM,RM)="A" THEN 470
RPJ 480 IF TEST$(RM,RM)=CHR$(N0) THEN TEST$(RM,RM)="A"
UUJ 490 QU=ASC(I$(RM*N2-N1)):AN=ASC(I$(RM*N2))
YIJ 500 PRINT :PRINT "QUESTION":PRINT A$(I,I+QU)
YYJ 510 PRINT "ANSWER":INPUT IN$
HZJ 520 IF IN$=A$(I+N76,I+N76+AN) THEN 570
NMJ 530 PRINT "INCORRECT. CORRECT ANSWER":PRINT A$(I+N76,I+N76+AN):D=D-N1
SLJ 540 IF TEST$(RM,RM)="A" THEN WRONG=WRONG+1:TEST$(RM,RM)="B"
YNJ 550 FOR I=N100 TO 255 STEP N4:SOUND N1,I,10,N8:NEXT I
TFJ 560 SOUND N1,10,N0,N8:GOTO 590
NVJ 570 PRINT "CORRECT!":TEST$(RM,RM)="A"
SJJ 580 FOR I=10 TO N0 STEP -N1:SOUND N1,N2,6,I:NEXT I
REJ 590 FOR T=N1 TO N100:NEXT T:SOUND N1,N0,N0,N0:D=D+N1:IF D<NUM THEN 470
YQJ 600 SC=INT(((NUM-WRONG)/NUM)*N100+0.5):? "TESTING OVER. YOUR SCORE: ";SC
VIJ 610 IF SC<90 THEN 640
QPJ 620 PRINT "EXCELLENT SCORE":FOR I=200 TO N0 STEP -N2:SOUND N0,I,10,N8
FQJ 630 SOUND N1,I+30,10,N8:NEXT I:SOUND N0,N0,N0,N0:SOUND N1,N0,N0,N0
SFJ 640 PRINT "DO YOU WANT TO TRY AGAIN";:INPUT IN$
AKJ 650 IF IN$(N1,N1)="N" THEN GOTO 70
CTJ 660 IF IN$(N1,N1)="Y" THEN GOTO 440
BWJ 670 GOTO 640
CTJ 680 GRAPHICS N0:PRINT "ADD DATA"
BWJ 690 GOTO 170
KHJ 700 GRAPHICS N0:PRINT "CHANGE DATA":GOSUB 950
FEJ 710 PRINT "QUESTION/ANSWER NUMBER YOU WANT":PRINT "TO CHANGE":INPUT D
VTJ 720 IF D>NUM OR D<N0 THEN PRINT "THAT NUMBER DOES NOT EXIST":GOTO 710
TRJ 730 I=D*N152-N151:QU=ASC(I$(D*N2-N1)):AN=ASC(I$(D*N2))
VBJ 740 PRINT "QUESTION #";D;":":PRINT A$(I,I+QU)
HCJ 750 PRINT "DO YOU WANT TO CHANGE THIS";:INPUT IN$:IF IN$(N1,N1)="N" THEN 780
QZJ 760 PRINT "ENTER NEW QUESTION:":INPUT IN$:QU=LEN(IN$)-N1
CYJ 770 I$(D*N2-N1,D*N2-N1)=CHR$(QU):A$(I,I+QU)=IN$:PRINT "QUESTION NOW READS:"
QJJ 780 PRINT IN$:PRINT :PRINT "ANSWER #";D;":":PRINT A$(I+N76,I+N76+AN)
SKJ 790 PRINT "CHANGE THIS";:INPUT IN$:IF IN$(N1,N1)="N" THEN 820
SXJ 800 PRINT "NEW ANSWER:":INPUT IN$:AN=LEN(IN$)-N1:I$(D*N2,D*N2)=CHR$(AN)
YNJ 810 A$(I+N76,I+N76+AN)=IN$:PRINT "ANSWER NOW READS:";PRINT IN$
HMJ 820 PRINT "MORE CHANGES";:INPUT IN$:IF IN$(N1,N1)="N" THEN GOTO 70
BSJ 830 GOTO 710
OUJ 840 GRAPHICS N0:PRINT "DISPLAY DATA":GOSUB 950
BPJ 850 FOR D=N1 TO NUM:I=D*N152-N151
MVJ 860 QU=ASC(I$(D*N2-N1)):AN=ASC(I$(D*N2))
XWJ 870 PRINT :PRINT "QUESTION #";D;":"
VQJ 880 PRINT A$(I,I+QU)
NXJ 890 PRINT "ANSWER #";D;":"
NEJ 900 PRINT A$(I+N76,I+N76+AN)
XRJ 910 NEXT D
OLJ 920 PRINT "PRESS RETURN FOR MENU"
UWJ 930 GET #N1,K:IF K<>155 THEN 920
YXJ 940 GOTO 70
MMJ 950 IF NUM>N0 THEN RETURN
Y6I 960 PRINT :PRINT "NO DATA HAS BEEN ENTERED.":PRINT :GOTO 920
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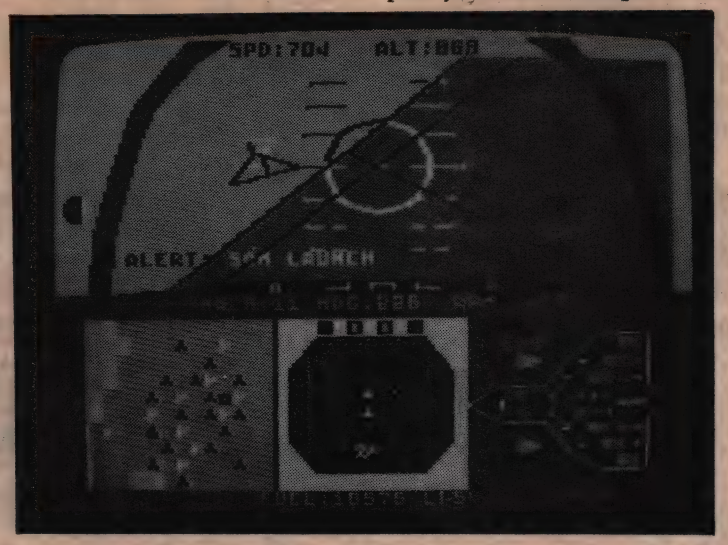
Hunt Valley, MD 21030
301-667-1151

MicroProse Software's newest release, F-15 Strike Eagle, is an impressively realistic air combat game that puts you in the cockpit of the "High-Tech, All Weather, Air Superiority and Ground Attack Fighter," America's F-15 jet. The game combines the animated graphics of a flight simulator, the excitement of combat weaponry and the program author's technical prowess to yield a truly captivating simulation—certainly the best work from MicroProse that I have seen to date.



F-15 Strike Eagle

Skill Levels and Options

The initial screen is a menu which offers a range of skill levels and a variety of missions. The menu on the Atari version seems sloppily done—colors are thrown about here and there making it difficult to read the text. It's possibly an attempt to create an overwhelmingly colorful menu, but the whole thing looks messy. Luckily, this first screen is not indicative of the quality of the actual game.

Four skill levels are offered: Arcade, Rookie, Pilot and Ace. In the Rookie, Pilot and Ace levels, the maneuvering of the aircraft is authentically reproduced; to turn left, the entire aircraft rolls to the left. The Arcade level offers a more simplified method of control for those who might be confused by the rolling. This level offers direct left, right, up and down motions of the craft corresponding to the movement of the joystick. The other levels offer more progressively difficult games.

One of several missions can also be chosen, each of which varies in the number of targets to be destroyed. The seven missions are situated in Libya, Egypt, Haiphong, Syria, Hanoi, Iraq and the Persian Gulf. Each mission has its own scenario, described in the in-

Continued on page 120

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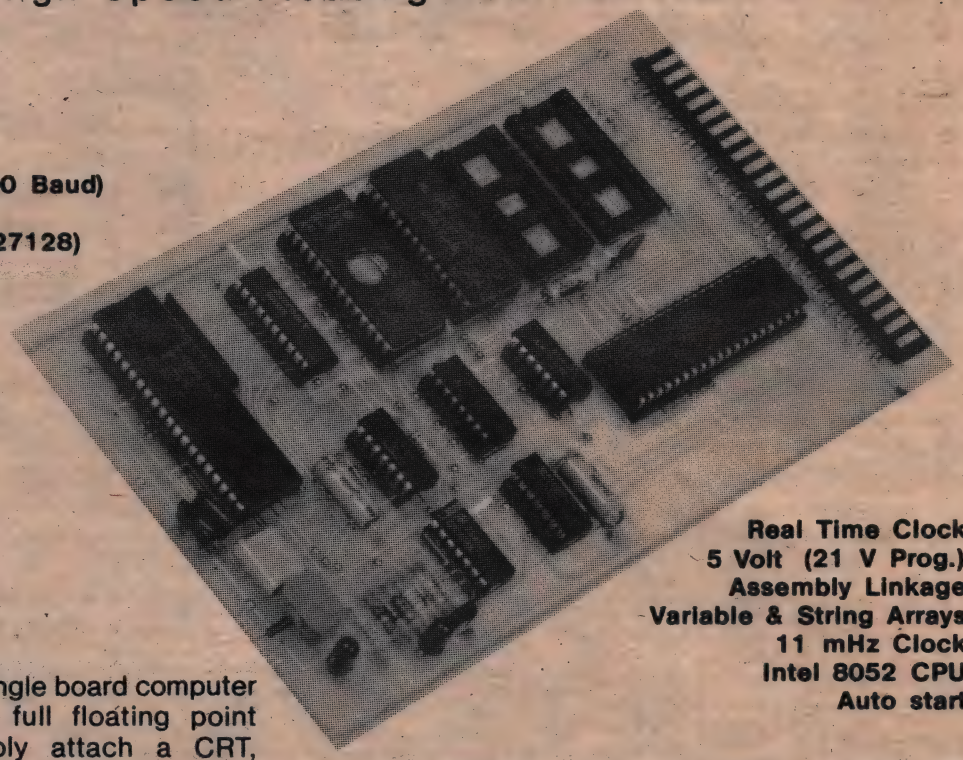

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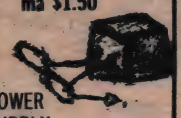

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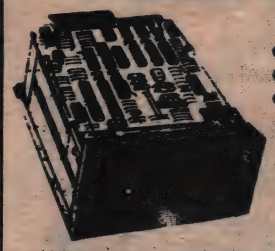

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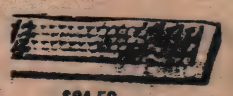

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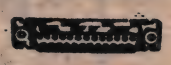

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F-15 Strike Eagle
Continued from page 118

struction booklet, in which you assume the role of either an American or an Israeli fighter. The booklet describes the situation, gives a suggested flight plan, and identifies potential threats. For example, in the Iraq simulation, it is June 7, 1981. An Iraqi nuclear reactor complex, which would be able to create nuclear weapons, is being completed. The object is to destroy the reactor through a secret attack. The flight plan is given as follows:

1) Penetrate air defenses below 1500 feet to avoid radar detection.

2) Bomb the reactor.

3) Bomb any SAM sites or air bases that could endanger this or a follow-up mission.

4) Return to base.

You are also told to be prepared for Iraq's SA-2 and SA-3 radar homing and SA-7 heat seeking SAMs.

Authentication Codes

Before you get to fly, you'll encounter the "Authentication Codes," one of the few reservations I have about this program. The computer will display something such as, "Authenticate (7)." You must then search through the instruction booklet for a small box entitled "TOP SECRET" which contains the parenthesized number and your brand of computer. This box will then tell you a letter to type for this prompt. If you enter the wrong number, you can still fly the plane, but you won't have access to many of the flight and weapons systems. What does this mean? It means that each time you play this game, you must have the instruction booklet with you to look up the proper code, and you must have very good eyesight to see the small letters.

These codes were no doubt included to minimize piracy (you need the instruction booklet to know the codes to play the game) and they were printed in microscopic print as to render photocopying ineffective. I fully support copy-protection techniques, but not when they cause inconvenience to legitimate users. I'm sure many people who have purchased this program will unknowingly be playing it without many of its features, either because the codes are too small to read, or because the whole code business is poorly described in the manual. I hope that MicroProse does not continue with this poorly devised protection scheme in their future programs.

The Heads-Up-Display

After you've chosen a skill level and mission and have looked up the authentication codes, the simulation begins. The well-designed display consists of four component screens.

Continued on page 122

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F-15 Strike Eagle
Continued from page 120

At the top, comprising one-half of the screen, is the Heads-Up-Display (HUD). The top of the HUD gives airspeed and altitude readings. An air-to-air reticle helps to aim guns and missiles for firing at airborne targets. An air-to-ground reticle appears on-screen when a bomb is to be launched for aiming at ground sites. Various markers also appear on the display, such as a target designator box and a missile designator box, for tracking these objects. All messages are communicated through the HUD. Messages such as "MISSILE ARMED," "ENEMY PLANE HIT," or "ALERT:SAM LAUNCH" appear when the appropriate situations occur.

Other Displays

The Horizontal Situation Display (HSD) is one of three smaller screens located below the HUD. The HSD consists of a map of the entire region over which you will be flying during the particular mission you have selected. Symbols on the map indicate your position and direction, the location of primary targets, enemy airfields, SAM sites and your base. It all sounds nice, but the HSD is even more useful. Using the cursor keys, you can move a "navigation cursor" over the position you wish to reach on the map. Then, on the HUD, a repeating series of letters "N," "A," and "V" serve as a steering cue. By directing your craft towards the cue, you will be flying in the direction of the desired location.

The Radar-Electronic Warfare Display (REWD) gives a radar view of the objects near your craft, such as missiles and enemy aircrafts. It also displays the various air targets. Included with the REWD are infrared and radar detectors which alert you to the presence of other ships or missiles.

The Weapons Status Display displays the complete inventory on-board the F-15. It lets you see how many bombs, missiles and flares remain.

Graphics and Sound Effects

Overall, the graphics are well done and the sound effects of the motor and artillery fire are authentic. The view through the HUD gives a convincing feeling of flight—the entire scene tilts as the plane rolls, and the surface below changes from green to blue once you're over water. The author could have made the graphics even better by making a distinction among the land sites. As it is, the enemy airports, primary targets, SAM sites and home base all look the same.

Controls

The joystick is used to control the general motion of the F-15 and to fire weapons. A second joystick can be used to control the throttle, speed brakes, afterburners and the weapons selector, although I find it more convenient to use the keyboard. The keyboard is also used to activate the gun and bomb modes, to select either short or medium range missiles, to release chaff as a

Continued on page 124

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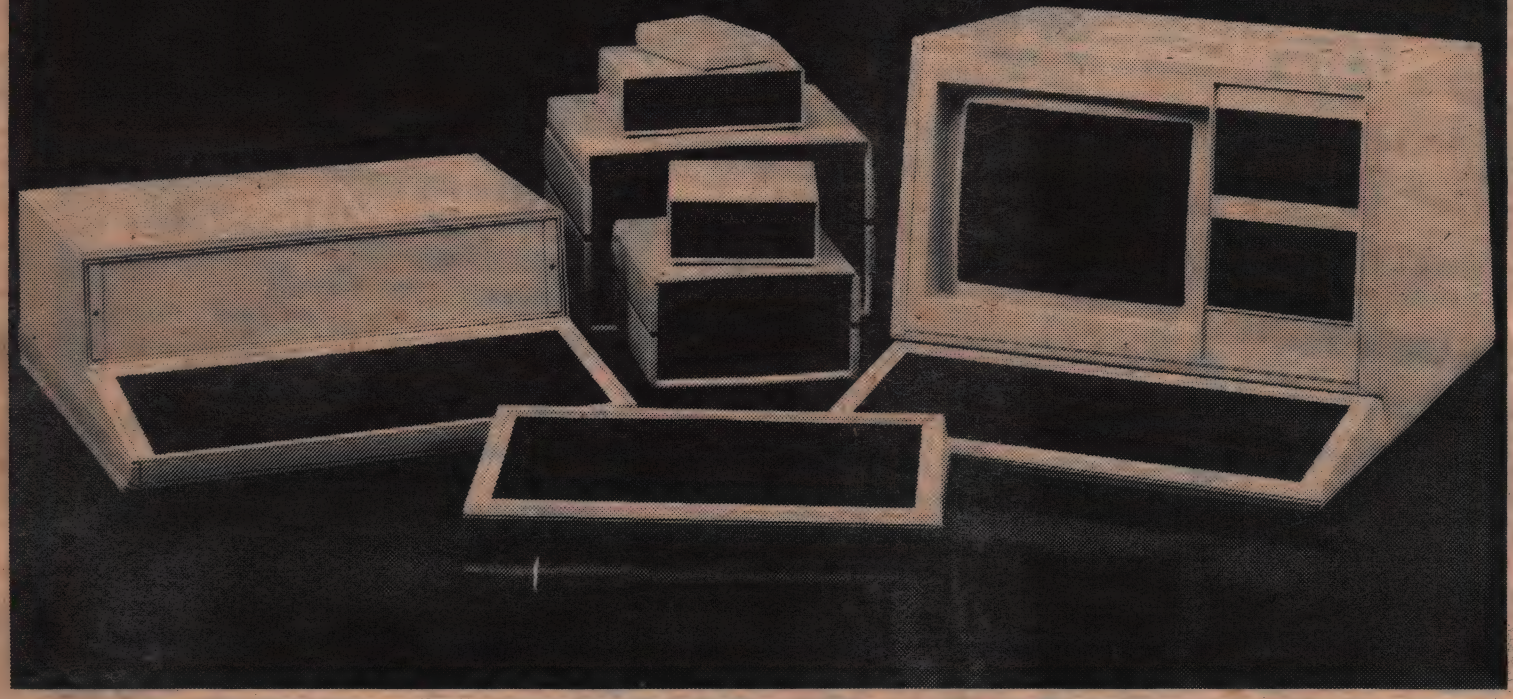

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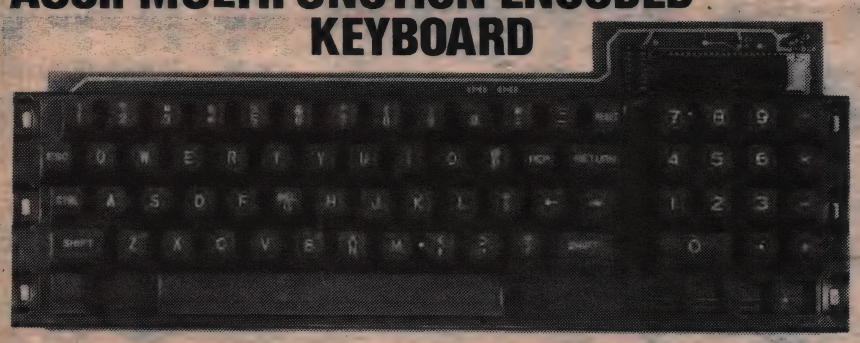

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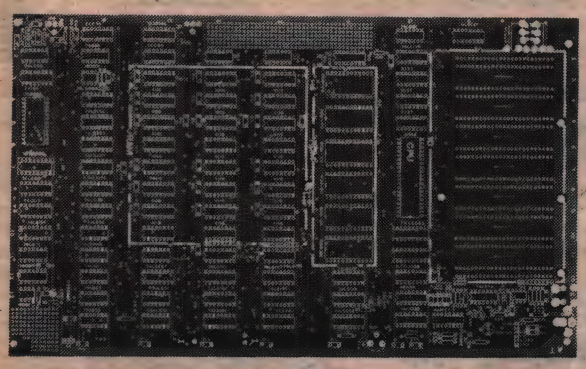

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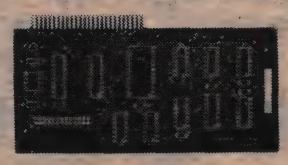

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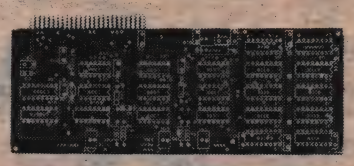

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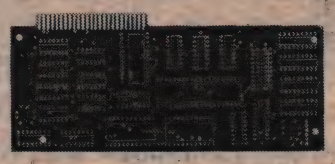

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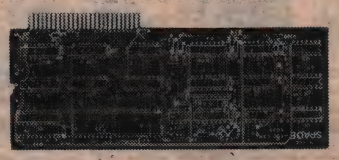

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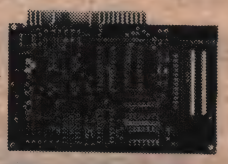

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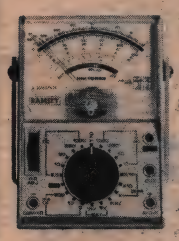

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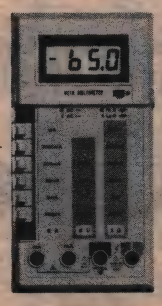

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F-15 Strike Eagle
Continued from page 122

radar jammer, to deploy flares to decoy heatseeking missiles, to drop the external fuel tanks when they are no longer needed and to change the radar range. A pause key is provided as well as a bail out key for desperate situations. If you bail out, you have a 50% chance of being rescued.

The simulation ends when you return to base. You are then given points for destroying SAM sites, enemy airports and planes. If you hit the primary target, your mission is a success and you get to tackle the next challenging mission.

Documentation

Even the 36-page documentation adds to the realism of this simulation. The booklet is entitled "Flight Operators Manual" with a "Technical Order No. 1-F-15E-1." Comprehensive descriptions of most of the features are included. Several pages are devoted to the technical analysis of the F-15, including sections on basic aerodynamics, turning performance, and the F-15's performance envelope. Recommended offensive and defensive air combat maneuvers are discussed, as well as bombing techniques. Details are given on the various types of aircraft and SAMs to be encountered during the simulation. At the end of the manual, each of the missions is detailed and maps of the areas are shown.

There is a problem with the manual, though, in that perhaps too much of it is devoted to unnecessary technical details and combat theories at the expense of directions needed to actually play the game. As I said previously, the authentication codes are not made clear enough. An even more serious fault is the failure to describe how to land the F-15 at your base. If you can't bring your craft to base, you can never complete a mission! I learned, through practice, that you must bring your F-15 in direct line with your base, and as close as possible to it. I don't know how MicroProse could have excluded this important piece of information.

In summary, F-15 Strike Eagle is challenging and thrilling. The attention to detail breeds realism, and the realism breeds excitement. This one was made to satisfy demanding players.

Ratings For F-15 Strike Eagle

*Poor**Fair***Good****Excellent

Program Design	***
Amusement Level	****
Documentation	***
Value	***
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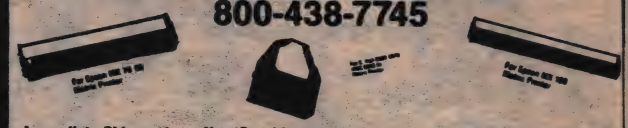

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TEXAS INSTRUMENTS

Upgrading The 99/4A Pt. 1 — The TMS9995

by Randy Holcomb

A question on just about everybody's mind is "where do we go from here for more processing power?" Since TI withdrew from the market the 99/8, the only known available upgrade to the home computer family was scrapped forcing 99/4A owners into an awkward position of having to make do with what they have or to sell their 99/4A systems and upgrade to a supported system such as an Apple, IBM or Commodore, usually at a much higher cost than what was originally paid for the 99/4A system.

The stillborn 99/8. Recently one of the prototype 99/8s (the infamous "Armadillo" codename) was shown at a recent 99/4A user's show in Chicago by Don Bynum, one of the original members of the home computer division of Texas Instruments. Some of its preliminary specs were revealed for the first time: a 10.7 MHz TMS 9995 processor, a full 65kbytes of user memory, a custom version of the TMS 9918A Video display processor and completely redesigned BASIC written entirely in machine code with full bitmap support and special graphics commands, and mapping support for over a megabyte of memory.

Conservative estimates rank this machine's capabilities as being 6 to 8 times faster than the current 99/4A and in many respects would have given Commodore, Apple and IBM a run for their money in terms of performance per dollar. Of course this is all moot because only a handful of these machines exist and it's further unlikely that TI will license its production. The 99/8 had a switch on it which placed the machine in "4A" mode which dropped it into the GPL monitor and looks like a /4A to maintain compatibility with the /4A software out in the market. However, it becomes apparent after looking at the specs that the 99/4A was just the entry mode for more grand plans.

First Steps in a New Machine. The 99/8 took many man-months to design and implement with some very talented people behind the project. To expect something of that magnitude from a handful of people in the /4A community would be expecting a lot; for starters, though, we CAN make a dent into the performance problems with just a little effort and some computer designed expertise. But first, some initial design criteria.

(1) The new machine should be fully compatible with the current /4A environment. This means that the ROM monitor and the GROMs will need to be transplanted into the new machine. GROMs can't be altered because of their inherent design, but the console ROM presents us with a new look at its implementation, and will be dealt with later.

(2) The new machine should be designed with state-of-the-art components with a slant towards providing increased reliability. Although this can increase the price of the unit, these costs are offset by higher reliability due to fewer components being used. Another offshoot of this is that the amount of heat dissipated will be greatly reduced because of lower power consumption. We all know how hot the /4A consoles can get!

(3) The new machine should provide provisions for additional memory beyond 65K and provide support for a new operating system environment. With the recent price drops in memory chips coupled with 256K DRAMs becoming available it's in everyone's best interest to take advantage of more memory. RAMDISK (simulation of a disk in memory) is also a consideration to be made.

The TMS9995 Processor. The heart of the 99/8 was the TMS9995, a third generation microprocessor in the TMS-9900 family. Unlike its grandfather the TMS9900, the 9995 uses an 8-bit data bus versus the 16-bit data bus used by the 9900. (See Figure 1 & 2) "How can the 9995 with its 8-bit bus be faster than the 9900 with a 16-bit bus?" I hear someone ask? The TMS9995 being a third generation processor is in reality a microcoded processor which is designed to walk and talk like a TMS9900 family member. Microcoded processors are processors that understand a special dialect of machine code called microcode. This microcode determines what instructions a processor can execute and describes the sequence in which the execution takes place. In large mainframe computers and in some micros the microcode can be altered to make a computer look like a completely different machine with a new instruction set. (See Figure 3 and Table 1) Microcode processors are often referred to as a "Micro-Engine."

Besides being microcoded, the TMS9995 takes advantage of a technique called "prefetch" which is found on most third-generation processors. Prefetch involves using the time that the processor is performing an internal operation (such as adding two numbers in the processors ALU) to perform a fetch of the next instruction that is to be executed, and then to decode the prefetched instruction internally while the processor stores the result of the previous operation. In effect this cuts down on the number of clock cycles used by the processor to execute the instruction by maximizing the microengine to do two operations at once. So, throwing all of this technobabble together gives us a processor that runs significantly faster than previously obtainable using standard implementations. In the case of the 9995 versus the 9900 a MOVB R0,R1 instruction would take 14 clock cycles on

Continued on page 134

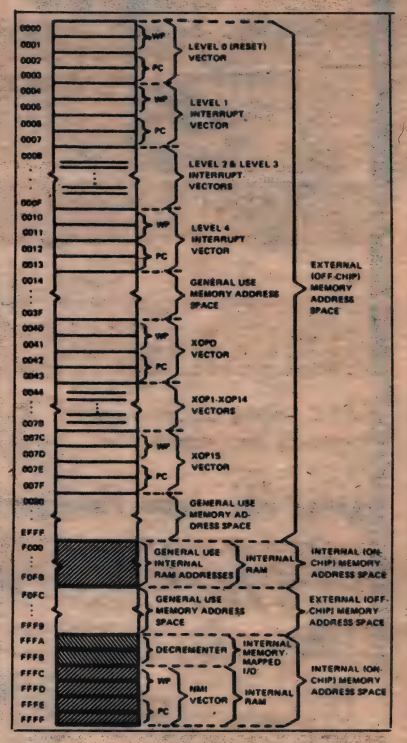

Figure 2—TMS9995 Memory Map

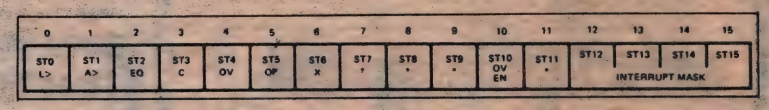

Figure 3—Status Register Bit Assignments

BIT	CRU BIT ADDRESS†	DESCRIPTION
FLAG0	1EE0	Set to 0: Decrementer configured as Interval Timer. Set to 1: Decrementer configured as Event Counter.
FLAG1	1EE2	Set to 0: Decrementer not enabled Set to 1: Decrementer enabled (will decrement and can set internal latch that requests a level 3 interrupt).
FLAG2	1EE4	Level 1 Internal Interrupt Request Latch CRU Input (Input-only). 0: Level 1 request not present 1: Level 1 request present
FLAG3	1EE6	Level 3 Internal Interrupt Request Latch CRU Input (Input-only). 0: Level 3 request not present 1: Level 3 request present
FLAG4	1EE8	Level 4 Internal Interrupt Request Latch CRU Input (Input-only). 0: Level 4 request not present 1: Level 4 request present
FLAG5 FLAG6 FLAG7 FLAG8 FLAG9 FLAGA FLAGB FLAGC FLAGD FLAGE FLAGF	1EEA 1EEC 1EEE 1EF0 1EF2 1EF4 1EF6 1EF8 1EFA 1EFC 1EFE	User Defined

Table1—Interrupt Level Data

Tables And Illustrations - Courtesy Of Texas Instruments Corp.

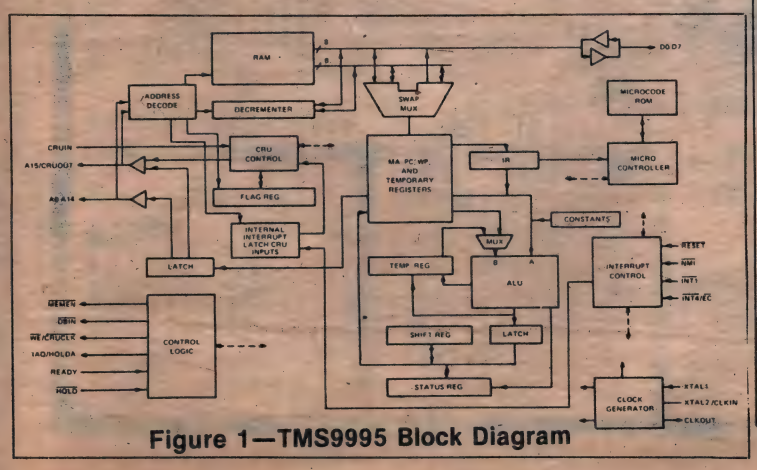

Figure 1—TMS9995 Block Diagram

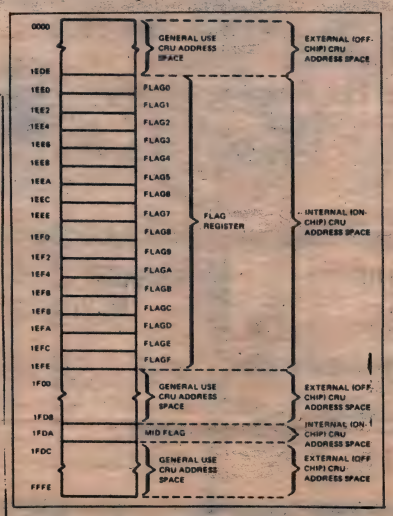

Figure 4—CRU Address Map

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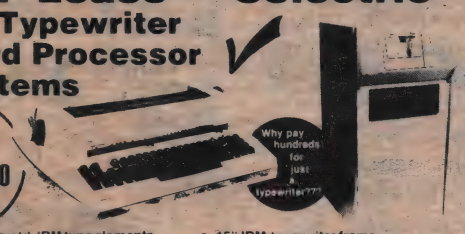

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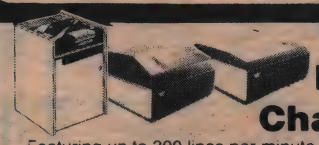

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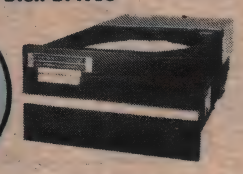

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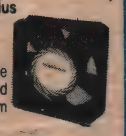

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FRANKLIN/APPLE USERS GROUP, 3262 AIRPORT BLVD.. MOBILE. AL 36606
G2C3, SPRING HILL COL.. MOBILE. AL 36608
GREATER GULF COAST COMPUTER CLUB SPRING HILL COLLEGE. MOBILE. AL 36608
HUNTSVILLE ATARI USERS GROUP c/o HAROLD BLEVINS. 514 JEFFREY DRIVE. NW.. HUNTSVILLE. AL 35806
M.O.C.U.G., MOBILE COMMODORE USER GROUP, 3262 AIRPORT RD.. MOBILE. AL 36606
MOHUG USERS GROUP, 3636 LINDEN LANE. MOBILE. AL 36608
MONTGOMERY ATARI COMPUTER ENTHUSIASTS 2307 WALBASH DRIVE. MONTGOMERY. AL. 36116
NEWTON'S TREE APPLE USER'S CLUB, PO BOX 4587, HUNTSVILLE, AL 35815
NORTH ALABAMA TI/99 COMPUTER USERS GROUP, POB 11204. HUNTSVILLE. AL 35014
SHOALS 99ers, PO BOX 2928. MUSCLE SHOALS. AL 35662
SOFTWARE SOURCE, 3262 SPRINGDALE MALL. MOBILE. AL 36606
S.M.A.U.G. (SOUTH, MOBILE AND ALABAMA USERS GROUP —TI-99) .Rt. 2 BOX 169-B. GRAND BAY. AL 36541
SOUTH ALABAMA USERS GROUP (SAPPLE),PO BOX 8189. MOBILE. AL 36608. 205-460-7815
VIC 20 USER GROUP, 3262 AIRPORT BLVD., MOBILE, AL 36606
WIREGRASS 99 HOME COMPUTERS USER'S GROUP, 106 HARWOOD PL.. ENTERPRISE. AL 36330

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POLAR PC's USER'S GROUP, c/o GLEN M. WILCOX. PO BOX 72934. FAIRBANKS. AK 99707
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SAN FRANCISCO TRS-80 USERS GROUP, 2001 WILLOW ST.. SAN BRUNO. CA 94066
SAN GABRIEL VALLEY 99 SERIES USERS GROUP, 1008 DONE ST.. W. COVINA. CA 91792
SAN GABRIEL VALLEY TRS-80 USER GROUP, C/O DAN DRESSELHAUS, 750 E. 5TH ST.. #75. AZUSA. CA 91702
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TIMEX Z80 USERS GROUP, 1624 Loughborough. Mercede. CA 95340
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TRS-80 MODEL 4 USERS GROUP, 14472 E. AMHERST. MOORPARK. CA 93021
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CONNHUG, 395 WEST MAIN ST.. AVON. CT 06001
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ATARI COMPUTER USERS OF TEMBROKE PINES, FL 1691 NW 97TH WAY. TEMBROKE. FL 33024 C/O NEAL OCHACHER
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COMPUQUEST, 3585FOWLER STREET. FT. MYERS. FL 33901
SUNCOAST APPLE USERS GROUP, PO BOX 7488. CLEARWATER. FL 33158. 1ST TUESDAY OF EACH MONTH. CLEARWATER CENTRAL CATHOLIC HIGH SCHOOL. 7:00 PM. FOR MORE INFORMATION CALL (813)531-7190
S.T.A.G. (SUNCOAST TAMPA APPLE GROUP), PO BOX 291079. TAMPA. FL 33687
SOUTH FLORIDA COMPUTER GROUP, FT. LAUDERDALE SECTION, PO BOX 22267. FT. LAUDERDALE.. FL 33335-2267
SPACECOAST APPLE USER'S GROUP, PO BOX 2112. MERRITT ISLAND. FL 32952
SPACECOAST MICROCOMPUTER, 315 INLET AVE.. MERRITT ISLAND. FL 32952
SPACE COAST NEC USERS GROUP, C/O FRANK SCHNEIDER. 70 CEDAR AVE..UNIT #1. COCOA BCH. FL 32931
SUNCOAST 99'ERS TI USERS CLUB, 6623 12 TERRACE N.. ST. PETERSBURG. FL 33710
TALLAHASSEE AMATEUR COMP SOCIETY, PO BOX 6716. TALLAHASSEE. FL 32314

TAMPA BAY COMMODORE CLUB, PO BOX 23952. TAMPA. FL 33623
TAMPA BAY TI99'ER USERS GROUP, 13097 LOIS AVE.. SEMINOLE. FL 33542
TAMPA BAY TRS-80 USERS GROUP, PO BOX 76001. ST. PETERSBURG. FL 33734
THE COMMODORE COMPUTER GROUP, PO BOX 9726. JACKSONVILLE. FL 33208. ATT: DAVID PHILLIPS OR DWAYNE MAYS
THE DAYTONA 99ERS, PO BOX 4594. S. DAYTONA. FL 32021

THE SOUTH FLORIDA ZX USERS GROUP, PO BOX 057381. WEST PALM BEACH. FL 33405
THE TAMPA BAY KAYPRO USERS GROUP, 14 CYPRESS DR.. PALM HARBOR. FL 33563
THE 99'ER TI USERS GROUP, PO BOX 1381. MAITLAND. FL 32751
TI 99/4A PO BOX 1119. DAVENPORT. FL 33837
TI PROGRAMMABLE CALCULATOR CLUB, TI PPC NOTES. PO BOX 1421. ARGO. FL 34294-1421
TI SPACE COAST 99-ERS, PO BOX 35. MERRITT ISLAND. FL 32952

TIMEX AND SINCLAIR BAY AREA MICROCOMPUTER USERS GROUP, PO BOX 644. SAFETY HARBOR. FL 33572
U.S.F. IBM PC USERS GROUP, SVS 409 UNIVERSITY OF SOUTH FLORIDA. 4202 E. FOWLER AVE.. TAMPA. FL 33620. ATTN: DR. LOWITT
TITUSVILLE COMMODORE CLUB, INC., meetings are held on the 2nd and 4th Wednesday of each month at St. Gabriel's Episcopal Church at 7 pm in Titusville. FL
TRI-COUNTY COMMODORE USERS GROUP, PO BOX 1151. OCALA. FL 32678
UKALOOSA COMP BLB, 156 N. ELGIN. FT. W. BCH. FL 32548

VIC-20 COMPUTER CLOB, C/O RAY THIGPEN. 4071 EDGEWATER DR.. ORLANDO. FL 32804
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WEST VAX 99ers, Box 176. ORANGE PARK. FL 32067
Z-HUG OF FORT PIERCE, 800 VIRGINIA AVE.. SUITE 4. FT. PIERCE. FL 33450
Z-X TIMEX GROUP, 950 CYNTHIA DR.. TITUSVILLE. FL 32780

Users Groups

LIST YOUR CLUB'S NAME AND ADDRESS COMPLIMENTS OF COMPUTER SHOPPER

Call or Write: (305) 269-3211; P.O. Box F, Titusville, FL 32780

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ATLANTA C-64 USERS GROUP, 1767 BIG VALLEY LANE. STONE MOUNTAIN. GA 30083
ATLANTA COMPUTER SOCIETY, PO BOX 888771. ATLANTA. GA 30356
ATLANTA COMPUTER SOCIETY ATARI SIG, 156 LEARNER COURT. MARIETTA. GA 30060
ATLANTA CONTACT ATARI GROUP, C/O N. CRANE. 779 ROLLINGWOOD DRIVE. STONE MT.. GA 30087
ATLANTA 99/4A USERS GROUP, PO BOX 19841. ATLANTA GEORGIA 30356
C-64 USER GROUP, Albany. GA.. 912-436-1950
COLUMBUS 99/4A USERS GROUP, 3434 FLINT DR.. COLUMBUS. GA 31907
CSRA COMPUTER CLUB, PO BOX 284. AUGUSTA. GA 30903
MGHUG, PO BOX 92.WARNER ROBINS. GA 31093
NEVADA COBAL USERS GROUP, 5536 COLBERT TRAIL. NORCROSS. GA 30092
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SAVANNAH COMP USERS GROUP, PO BOX 14364. SAVANNAH. GA 31404
SIVIC-9000, 362 PEACHTREE AVENUE. ATLANTA. GA 30305
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THE ATLANTA NORTHSTAR USER'S GROUP, PO BOX 98397. ATLANTA. GA 30359
TRS-80 USER'S GROUP OF ATLANTA, 1637 COLUMBIA DR.. DECATUR. GA 30034

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68XX USERS GROUP, P.O. BOX 30107. HONOLULU. HI 96820
ALOHA 99/4A USERS GROUP, C/O PHILLIP MARKHAM 92865 PALAILAI ST.. MAKAKILO. HI 96706
CHAMINADE UNIVERSITY COMPUTER WORKSHOP, 3140 WAIALAE AVE.. HONOLULU. NI 96861
HAWAII PORTABLE COMPUTER USERS GROUP, C/O COMPUTER MARKET. HECTOR ROBERTSON. PRES.. 578 ALA MOANA BLVD.. HONOLULU. HI 96813

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POCATELLO MICROCOMPUTER CLUB, 361 PARK WAY DR.. POCATELLO. ID 83201
POCATELLO ORGANIZATION OF WRITERS IN LOGO (O.W.L.), C/O WILLIAM J. McCURDY. 2946 S. 5TH AVE.. POCATELLO. ID 83204. 208-233-5422

ILLINOIS

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The C-64 USERS GROUP, INC., C/O DARRELL HANCOCK & DAVID TAMKIN. P.O. BOX 46464. LINCOLNWOOD. IL 60646
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CHICAGOLAND KAYPRO USERS GROUP, 605 ILLINOIS RD. WILMETTE. IL 60091
CHICAGO AREA NORTHSTAR USERS GROUP, PO BOX 9. PARK RIDGE. IL 60068
CHICAGO AREA T-BUG, TANDY BUSINESS USERS GROUP. 26940 NORTH LONGWOOD RD.. PO BOX 631. LAKE FOREST. IL 60045
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ILLINOIS COLOR COMPUTER CLUB OF ELGIN, 720 RAYMOND STREET. ELGIN. IL
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MAX—80 USERS GROUP, 5201 MILWAUKEE AVE.. 2ND FLOOR. CHICAGO. IL
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MID ILLINOIS COMP. RESOURCE ORGANIZATION, PO BOX 766. BLOOMINGTON. IL 61701
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NORTHERN ILLINOIS COLOR COMPUTER CLUB, 1217 KINGS COURT #12. WEST CHICAGO. IL 60185
NORTHERN ILLINOIS COMPUTER OWNERS, 26 W. 484 BUTTERSFIELD. WHEATON. IL 60187
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SINCLAIR END USERS' GROUP, C/O DIANA WRIGHT. 2170 OAKBROOK CIRCLE. PALATINE. IL 60067
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Z-80 STARTER KIT USER'S GROUP, 6000 PUFFER RD.. DOWNERS GROVE. IL 60516
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CP/MORROW GROUP OF INDIANA, 57 VINE ST.. HUNTINGTON. IN 46750
EVANSVILLE COMPUTER CLUB, PO BOX 3284. EVANSVILLE. IN 47732
FORT WAYNE APPLE COMPUTER USES GROUP, PO BOX 11507. FORT WAYNE. IN 46858
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INDIANA OSBORNE USERS, 317 NORTH FESS. BLOOMINGTON. IN 47401 812-339-4754
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MUNCIE PC USERS GROUP, 2809 E. JACKSON ST.. MUNCIE. IN 47303
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IOWA

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CENTRAL IOWA 99/4A USERS GROUP, 3013 EAST 32ND STREET. DES MOINES. IA 50317
CENTRAL IOWA 99/4A USERS GROUP, C/O ROBERT UTTER. 3013 E. 32ND ST.. DES MOINES. IA 50317
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HAEKATARI, 2564 22ND AVE.. MARION. IA 53202. ATTN: JOHN WIESE
HAWKEYE - PC, IBM PC USERS GROUP. 385 COLLINS RD. N.E. SUITE 201. CEDAR RAPIDS. IA 52404
IOWA CITY TRS-80 USERS GROUP, C/O JOHN GREEN. P.O. BOX 1494. IOWA CITY. IA 52244
IO/WA, 7 TIMBERLANE DR.. CLEAR LAKE. IA 50428
IOWA USER GROUP, 844 10 ST. N.E.. MASON CITY. IA 50401
MIDWEST ATARI GROUP, IOWA CHAPTER (MAGIC). 1125 3RD ST.. NEVADA. IA 50201
QUAD CITY COMPUTER CLUB, 215 MAIN ST.. #515. DAVENPORT. IA 52801
THE GREEN APPLES, BOX 622. CEDAR FALLS. IA 50613

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TI INTEREST GROUP, 5522 EAST HARRY. WICHITA. KS 67218

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MEGA CITY 1, PO BOX 187. JACKSON. LA 70748
N.E.L.A.C., NORTHEAST LOUISIANA APPLE CLUB. C/O DR. HARPER GAUSHELL. PRES.. ROOM 280. STRAUSS HALL. NORTHEAST LOUISIANA UNIVERSITY. MONROE. LA 71209
T.A.W.U.G., C/O JIM WILLIS. 1300 HINTON ST.. WEST MONROE. LA 71291
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SOUTHERN MAINE TRS-80 USERS GROUP, 82 WELLINGTON ROAD. PORTLAND. ME 04103
TRANET, PO BOX 567. RANGELEY. ME 04970

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SOUTHERN MARYLAND APPLE USERS GROUP, PO BOX 398. LEXINGTON PARK. MD 20653
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THE BOYDS CONNECTION, 21000 CLARKSBURG. RD.. BOYDS. MD 20841
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TRS-80 USERS GROUP OF BALTIMORE, 102 N. COLLINGTON AVE.. BALTIMORE. MD 21231
VICLIQUE (LINTHICUM HEIGHTS), 105A. CODDIUT ST.. ANNAPOLIS. MD 21401
WASHINGTON APPLE PI, 8227 WOODMONT AVE.. SUITE 201. BETHESDA. MD 20814

MASSACHUSETTS

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M.U.N.C.H., 1241 MAIN ST., WORCESTER, MA 06103
MICRO, PO BOX 6502. CHELMSFORD. MA 01824
MAGNETIC (TI 99/4A). 57 RIVER RD.. ANDOVER. MA 01810
MITRE SMALL COMPUTER SOCIETY, MITRE CORP.. C/O M. THEODORE. BEDFORD. MA 01730
NBE BIRD WATCHERS' COMPUTER CLUB, 31 PLUMMER AVENUE. NEWBURYPORT. PA 01950
NEW ENG. COMP SOC, PO BOX 198. BEDFORD. MA 01730
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NORTH SHORE APPLE GROUP, PO BOX 59. ROCKPORT. MA 01966
PET USERS GRP, WALTHAM HS. NOSTON. MA 02154
SMUDGE (DIGITAL GROUP), C/O JEB BOSWELL. M.D.. 29 KENILWORTH ST.. NEWTON. MA 02158
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THE BOSTON COMPUTER SOCIETY, ONE CENTER PLAZA. BOSTON. MA 02108
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TRVDGEM-TRS-80-MODEL 3/4P USERS GROUP, C/O BILL HEISER. KENDALL SQ. BOX 891. CAMBRIDGE. MA 02142

MICHIGAN

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APPLE L.U.G., PO BOX 271. HASLETT. MI 48840
BASIC 99ER'S, 1504 S. VASSAR RD.. BURTON. MI 48509. (313) 742-1329
BASIC VIC, C/O BRIAN BROWN. 1504 S. VASSAR. BURTON. MI 48509. (313)742-1329
BATTLE CREEK MICROCOMPUTER CLUB, 8587 Q DR.. NORTH BATTLE CREEK. MI 49017
CANTON COLOR COMPUTER CLUB, C/O WADE R. HAMPTON. PO BOX 87586. CANTON. MI 48187-0586
CAPITOL HILL ATARI OWNERS SOCIETY (C..A.O.S.), PO BOX 16132. LANSING. MI 48901
CENTRAL MI TRS 80, 220 E. KALAMAZOO. LANSING. MI 48932
CENTRAL MICHIGAN TRS-80 USERS GROUP, 1309 WOODINGHAM DR.. EAST LANSING. MI 48823
COLOR COMPUTER OWNER'S GROUP, PO BOX 1113. DEARBORN. MI 48121
DEARBORN TRS-80 (TM) USERS GROUP, C/O PAUL SOCKOW. P.O. BOX 1942. DEARBORN. MI 48121
DETROIT INTERACT GROUP, 15356 PREVOST. DETROIT. MI 48227
DETROIT FIRST OSBORNE USERS GROUP, 17452 STAMWICK. LIVONIA. MI 48152. (313) 422-0928
ERCC (EDUCATIONAL, RECREATIONAL COMPUTER CLUB), PO BOX 325. OWOSSO. MI 48867
FLINT 65XX-68XX USER GROUP, PO BOX 4310. FLINT. MI 48504
GRAND RAPIDS APPLE (GRAPPLE), 5326 BROOKWOOD DR. S.E.. KENTWOOD. MI 49508
GRAND RAPIDS 99 USERS GROUP, BOX 1649. GRAND RAPIDS. MI 49501
GREAT LAKES COMPUTER GROUP (TI99/4A), PO BOX 7151. ROSEVILLE. MI 48305
HACKERS CLUB OF AMERICA, 19200 FREELAND. DETROIT. MI 48235
HEATH USER'S GROUP, HILLTOP RD.. ST. JOSEPH. MI 49085
KALAMAZOO AREA COMPUTER ASSOCIATION, 1927 WINCHELL AVE.. KALAMAZOO. MI 49008
LAKE SHORE COMPUTER USERS, PO BOX 5062. MUSKEGON. MI 49445
LOWER MICHIGAN 99/4A USERS GROUP, PO BOX 885. TROY. MI 48099
MACE — MICHIGAN ATARI COMPUTER ENTHUSIASTS, PO BOX 2785. SOUTHFIELD. MI 48037
MICHIGAN APPLE COMPUTER CLUB, PO BOX 551. MADISON HEIGHTS. MI 48071
THE MONROE COMPUTER CLUB, C/O HARDWARE — SOFTWARE INTEGRATIONS. 1811 North Telegraph Road. #72. Monroe. MI 48161-9251
MUG DETROIT, C/O THOMAS C. MUSOLF. 13825 HAVERHILL COURT. SOUTHGATE. MI 48195
NATIONAL TRS-80 MODEL II USERS GROUP, PO BOX 234. ADA. MI 49301
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VALLEY FORGE TRS-80 USERS GROUP, 1000 VALLEY FORGE CIRCLE. KING OF PRUSSIA. PA 19406
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Digital Expands Ethernet Baseband Into Broadband Environment

Digital Equipment Corporation today became the first computer manufacturer to extend the Ethernet approach to Local Area Networks (LANs) from the baseband to the broadband environment. The company announced a new Broadband Ethernet Transceiver, or DECOM, fully compatible with its Ethernet hardware and software products, and an associated Broadband Ethernet Frequency Translator, or DEFTR, that provide connection to broadband cabling. The network provides access to nodes up to 3,800 meters apart.

The new transceiver and translator are the industry's first broadband products that are truly compatible with Ethernet. They are designed to connect to Digital's Ethernet controllers for VAX, PDP-11, and Professional 300 computer systems. Additionally, they can be connected to Digital's router, gateway, and Terminal Server products, and the DELNI clustering device.

The new products are targeted to customers who are already committed to broadband cabling for distribution of multiple information services including video, data, and voice. They run under Digital's Phase IV DECnet networking software, and are functionally equivalent to Digital's baseband Ethernet products.

DECOM provides full Ethernet functions on broadband, including a data rate of 10 Mbits/second. It will support up to 1,024 nodes, and is available for both dual- and single-cable broadband installations. When used in conjunction with the DELNI clustering device, DECOM provides connection to as many as eight DECnet/Ethernet devices.

DEFTR is used in conjunction with DECOM in single-cable installations. It enables a DECOM to transmit at one set of frequencies and receive on another. In dual-cable installations, a DEFTR is unnecessary since the DECOM can transmit and receive at the same frequency using separate connection points for each cable.

DECOM is priced at $4,250, and DEFTR at $4,500. Both will be available in spring, 1985.

Digital's broadband products attach to conventional cable television (CATV) cabling and components. They employ the Ehternet Carrier Sense Multiple Access with Collision Detect (CSMA/CD) protocol, including guaranteed collision detection, and require an 18 MHz bandwidth. Via DECnet routers, Digital's broadband and baseband LANs can be interconnected. Via Digital's X.25 and SNA gateways, both broadband and baseband DECnet/Ethernet LANs can be connected to other network environments.

For further information contact Digital Equipment Corporation, Maynard, MA 01754.

Mention that you read about it in Computer Shopper. ●

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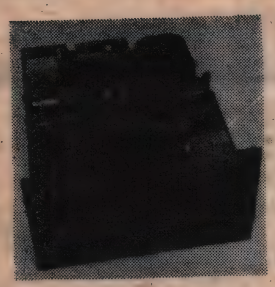

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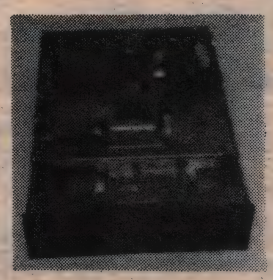

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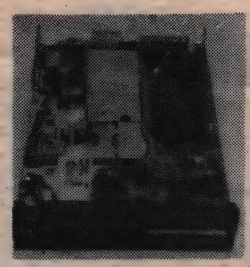

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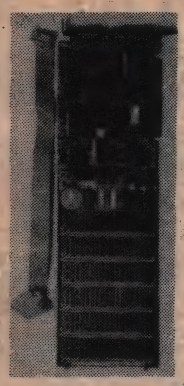

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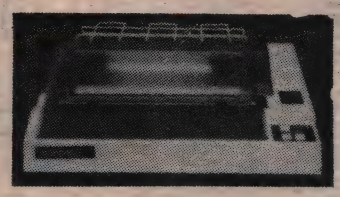

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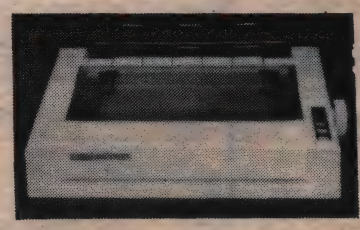

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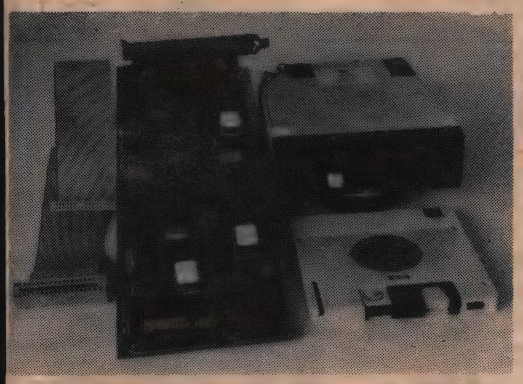

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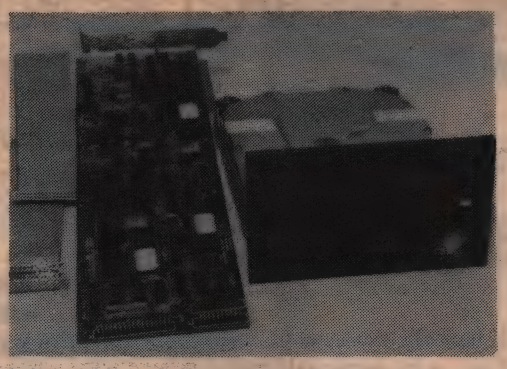

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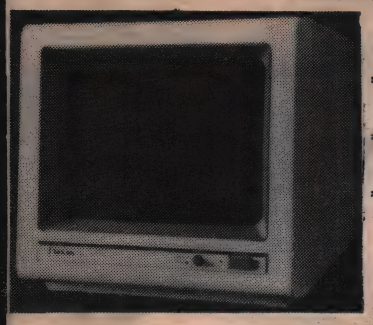

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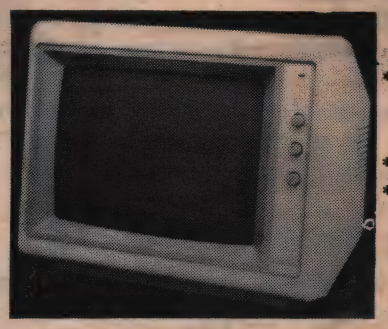

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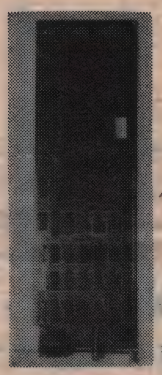

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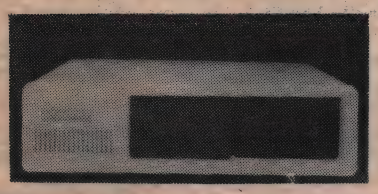

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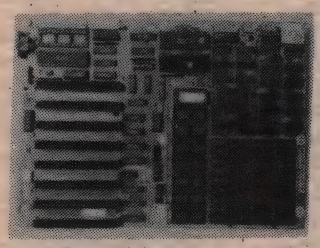

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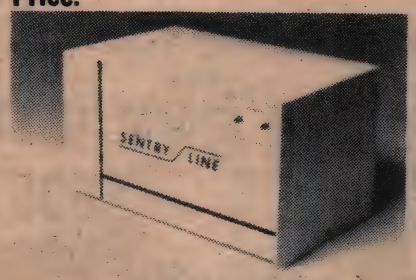

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Upgrading the 99/4A

Continued from page 125

the 9900 but only 4 clock cycles in a 9995. Since each clock cycle is 333 ns the 9900 takes 4.6 usec to do the MOVB, the 9995 takes only 1.2 usec.

Other 9995 Features. Increased isn't the only thing the 9995 gives us. The CRU address (See Figure 4) space has been increased from 4096 bits to 32,768 bits, allowing us to increase our available I/O space beyond >1FFF to >7FFF, but several patches will need to be applied to both ROM code and to some utility code to allow us to get at all of this new space. Two new instructions, signed multiply and signed divide, have been added to the 9900 instruction repertoire. Other hardware additions include a built-in interval timer/event counter residing at memory location >FFFA->FFFB, trapping of illegal instructions through a

Continued on page 137

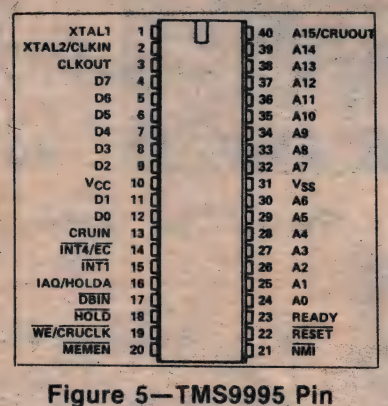
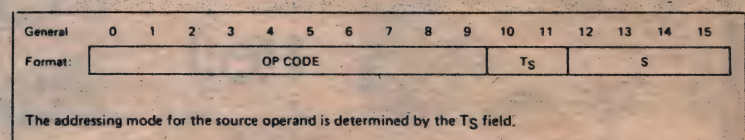


Figure 5—TMS9995 Pin Assignments

MNEMONIC	OP CODE 0 1 2 3 4 5 6 7 8 9	MEANING	RESULT COMPARED TO 0	STATUS BITS AFFECTED	DESCRIPTION
MPYS	0 0 0 0 0 0 0 0 1 1 1	Signed Multiply	Yes	0-2	Multiply signed two's complement integer in WR0 by signed two's complement integer (SA) and place signed 32-bit product in WR0 (most-significant) and WR1 least-significant.
DIVS	0 0 0 0 0 0 0 0 1 1 0	Signed Divide	Yes	0-2,4	If the quotient cannot be expressed as a signed 16 bit quantity (8000 (hex) is a valid negative number), set ST4. Otherwise, divide signed, two's complement integer in WR0 and WR1 by the signed two's complement integer (SA) and place the signed quotient in WR0 and the signed remainder in WR1. The sign of the quotient is determined by algebraic rules. The sign of the remainder is the same as the sign of the dividend and |REMAINDER| < |DIVISOR|

Figure 6—Signed Multiply and Divide Instructions



The addressing mode for the source operand is determined by the T_S field.

T_S	S	ADDRESSING MODE	NOTES
00	0, 1 . . . 15	Workspace register	1
01	0, 1 . . . 15	Workspace register indirect	1
10	0	Symbolic	1
10	1, 2 . . . 15	Indexed	1,2
11	0, 1 . . . 15	Workspace register indirect auto increment	1,3

NOTES: 1. Workspace registers 0 and 1 contain operands used in the signed multiply and divide operations.
2. Workspace register 0 may not be used for indexing.
3. The workspace register is incremented by 2.

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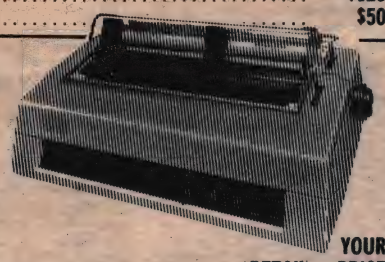

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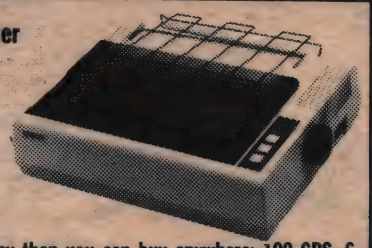

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Upgrading the 99/4A
Continued from page 134

facility known as Macro Instruction Detect (MID), and new interrupt bits have been added for arithmetic overflow and MID interrupts. Some of the new features of the 9995 are enabled by setting certain CRU addresses; these are shown in Table 2. Some of these options if used in the 99/4A environment can cause problems or cause the system not to function properly, so care must be exercised when using one of the above facilities.

One little detail I forgot about the 9995: it has 256 bytes of on-chip RAM available (which is split into two segments from >F000 to >F0FB and from >FFFA to >FFFF) which can be used for small routines to further increase the execution speed as no external memory accessing is required: in our above MOVB example is the instruction and the operands were all in the on-chip RAM the time requires drops in half-to 666 ns. When on-chip memory or on-chip CRU locations are accessed, the 9995 tri-states the address and data lines (See Figure 5) off the system bus, so no conflict with other devices can occur.

What We Are Aiming For. By introducing you to the 9995 we are in a good position to understand what we want to do in proceeding to build a 99/4A upgrade. Our intentions are to design, prototype and

Continued on page 138

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BBS IBM HOSTCOMM Fairfax. VA 703-591-5120 *24
BBS IBM HOSTCOMM Fairfax. VA 703-425-9452 *24
BBS IBM HOSTCOM Springfield. VA 703-425-7229 *24
BBS IBM PC Annandale. VA 703-560-0979 *24
BBS IBM PC Dale City. VA 703-680-5220 *24
BBS IBM PC Vienna. VA 703-560-7803 *24
C-HUG BBS Fairfax. VA 703-360-3812 *24
CARRIER Alexandria. VA 703-823-5210
CBBS Amrad. Washington. DC 703-734-1387 *24
FORUM-80 Prince William City. VA 703-670-5881
POTOMAS MICRO MAGIC, INC. Falls Church. VA 703-379-0303 *24
SWITCHBOARD Alexandria. VA 703-765-2161 *24
THE BELMONT CONNECTION Christiansburg. VA 703-382-0984
THE DISK CONNECTION, CP/M SYSTEM 703-644-2299 *24
RCP/M Arlington. VA 703-536-3769
RCP/M CBBX RLP Maclean. VA 703-524-2549 *24
ABBS Charlotte. NC 704-364-5252
CLEVELAND COUNTY YBBS Kings Mtn. NC 704-482-8012 *24
WNCCCS Boone. nC 704-262-1861 300/1200 BAUD *24
COAST BBS 707-964-7114 *24
NBUG-64 DIRECT CONNECTION II Vallego. CA 707-554-2424
RCP/M RBBS Napa Valley. CA 707-253-1523
ABBS MADAM BOKEATHA SOCIETY Houston. TX 713-455-9502
ABBS YOUNGS ELECT. SVS. College Station. TX 713-693-3462
ACOM ATARI Houston 713-530-0164 *24
AMERICAN CONNECTION IBM Houston 713-831-3768 6pm-7am
APPLE ASTRONOMY APPLE Houston 713-526-5671 *24
ARMADILLO MEDIA SERVICES Houston. TX 713-444-7098
ARTURUS APPLE Houston 713-550-4202 *24
BAY AREA RCP/M Houston 713-488-5619 *24
BBS IBM HOSTCOMM Houston. TX 713-890-0310
BIT BUCKET IBM Houston 713-332-4006 *24
BRAINBUSTERS Houston 713-776-8043 *24
CAPTAINS COVE ATARI Houston 713-480-2094 *24
CITYSCOPE TRS80 Houston 713-477-7475 *24
COMMODORE CONNECTION 713-463-6335 *24
COMMODORE EXCHANGE Houston 713-496-7161 *24
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OASIS ATARI Houston 713-461-4842 *24
PACKET BOARD OSBRN Houston 713-530-8596 *24
PC EVE CMPAQ Houston 713-955-7564 *24
PC'S DOMAIN IBM -3 Houston 713-356-4701
POOR MAN'S BBS TRS80 Houston 713-453-7931 *24
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AMIS ATARI DOG HOUSE Riverside. CA 714-787-9600
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BULLET-80 Orange County. Anaheim. CA 714-952-2110
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GREENE MACHINE Riverside. CA 714-354-8004
IBDN INFO-NET Costa Mesa. CA 714-545-7359
KANDY SHACK -1 Riverside. CA 714-354-8004
KANDY SHACK -2 Riverside. CA 714-781-3767
MOONSTAR RBBS RCP/M Diamond Bar. CA 714-861-8165
NORTH ORANGE COUNTY COMPUTER CLUB 714-633-5240
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FORUM-80 Charleston. SC 803-552-1612 *24
MIDLANDS 80 COMPUTER CLUB Columbia. SC 803-776-8261 *24
MICRO & DATA SYSTEM Orangeburg. SC 803-534-5350
RCP/M RBBS Fort Mill. SC 803-548-0900 *24
DIAL-YOUR-MATCH -32 Newport News. VA 804-838-3973 300 baud *24
The GREAT GAMMA COLOR 80 BBS OF THE COLONIAL CAPITAL OF VIRGINIA Williamsburg. VA 804-887-5302
IBM PC RBBS Hampton. VA 804-851-1369 300/1200 baud *24
NBBS Norfork. VA 804-444-3392
PENINSULA COCO BOARD Tabb. VA 804-868-0922 300/1200 baud *24
RC?/M OXGATE Grafton. VA 804-898-7493 300/1200 baud *24
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TALK-80 ROBB Portsmouth. VA 804-484-9636
TIDEWATER APPLE WORMS, T.AW.B.B.S. 804-543-7194 *24
VIRGINIA PASTE BOARD Hampton. VA 804-722-0935
VOLKSBOARD TBBS Newport News. VA 804-877-7141 300/1200 baud *24
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BBS IBM PC 805-987-4127
CBM-U COMMODORE Bakersfield. CA 805-871-2725 *24
CBM-U COMMODORE Los Osos. CA 805-7475 *24
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Q-BOTS 805-644-0400
PACIFIC CONFERENCE TREE Oxnard. CA 805-985-2591
RCP/M CBBS CP/M NET Simi Valley. CA 805-527-9321

REMOTE NORTHSTAR Santa Barbara. CA 805-682-7876
REMOTE NORTHSTAR Santa Barbara. CA 805-964-4115
SPACE ' MISSILE COUNTRY IBM Santa Maria. CA 805-937-0124
THE COMPUTER CONNECTION Thousand Oaks. Ca 805-496-0850
THE WALL (TRS-80) Santa Barbara. CA 805-682-4230 *24
ABBS COMPUTER CORNER Amarillo. TX 806-355-5610
BULLET-80 Littlefield. TX 806-385-6843
FIDO-NET -67 Lubbock. TX 806-795-0102
MICRO-TECH NET Lubbock. TX 806-742-2917
THE RED RAIDER BBS Lubbock. TX 806-793-1009
THE WINDMILL COMPANY Lubbock. TX 806-763-3375
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NET-WORKS COMPUTER MARKET Honolulu. HI 808-521-7312
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ATARI (RUN) on a F.O.R.E.M. Program, T.H.A.T.S. 812-299-9891
COMPU-PRESS Evansville. IN 812-479-8420 *24
ALPHA Tampa. FL 813-969-0512
BSBB Tampa. FL 813-885-6187
CBM-U COMMODORE Largo. FL 813-391-5219
CBM-U COMMODORE St. Pete. FL 813-526-6304
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RCP/M RBBS Tampa. FL 813-831-7276 *24
RCP/M RBBS Tampa. FL 813-988-7400 *24
SMITTY'S BBS Tampa. FL 813-875-8096 *24
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T.A.B.B. Tampa. FL 813-886-0284 *24
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TELECOM-80/TWZ Tampa. FL 813-839-6746
THE PORT Tampa. FL 813-961-8483 *24
THE TAMPA BY BANDIT BOARD 813-937-3608 *24
TIBBS St. Pete. FL 813-526-1265. 813-525-7998
PHANTOM ACCESS 814-868-1884
RCP/M CUG NODE PA State College 814-238-4857 *24
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CHANGE BBS 814-774-4620 *24
TRADE-80 Erie. PA 814- 898-2952 *24
THE FIRST CHART-BOARD Woodstock. IL 815-337-0279 *24
GBBS-THE DARK CASTLE Galena. IL 815-777-3327 7am-11pm
MCMS J.A.M.S. Lockport. IL 815-838-1020 *24
NETWORKS-THE DARK CASTLE Shorewood. IL 815-729-0188 *24
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FORUM-80 Kansas City. MO 816-931-9316
FREE THOUGHT WAFER Kansas City MO 816-761-2070 *24
HOWARD'S NOTEBOOK Belton. MO 816-331-5868 *24
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NET-WORKS ABC Kansas City. MO 816-483-2526 8pm-8am
TIBBS Kansas City. MO 816-444-4163
ABBS TELEDUJON I Dallas. TX 817-469-1626
The [IR[US BBS Nocone. TX 817-825-4538 *24
COMNET-80 Wichita Falls. TX 817-767-5847
FORUM-80 Wichita Falls. TX 817-855-3916
NET-WORKS COMPUTER PRO Ft. Worth. TX 817-732-1787
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THE SPEAK EASY Van Nuys. CA 8818-905-6262
ABBS COMPUTER LAB Memphis. TN 901-761-4743
COUNTRY MUSIC STATE TBBS Union City, TN 901-885-2791 SYSOP Warren Kingsbury *24
The TENN. RIDGE RUNNER TBBS Tiptonville. TN 901-253-6534 *24
TRADE 80 Tiptonville. TN 901-253-6534
WESTAR Big Sandy. TN 901-593-5506 9pm-5am. Central
BEACH FOREMX1 Jax Beach. FL 904-246-8733
CENTRAL BBS Mt. Dora. FL 904-383-1133 5pm-5am
JAX FOREM Orange Park. FL 904-733-4575
APPLE BBS SCHOOL OF TECHNOLOGY Houghton. MI 906-487-2589 *24
ABBS Ketchikan. AK 907-225-6789
CONFERENCE-TREE Anchorage. AK 907-344-5251
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NET-WORKS PIRATE'S LODGE 914-634-1268
OSUNA Scarsdale. NY 914-725-4060
RCP/M RBBS Brewster. NY 914-279-5693
RCP/M RBBS Woodstock. NY 914-679-8734 *24
RCP/M SJBBS Bearsville. NY 914-679-6559
RMN CompComm Thiells. NY 914-942-0386 SYSOP Roger Nader
ST80-PBB MONROE CAMERA SHOP Monroe. NY 914-782-7605
WESTCHESTER BBS Yonkers. NY 914-965-2355
CROWLEY MANOR Midland. TX 915-694-0004
RCP/M RBBS COMP. TECH. El Paso. TX 915-533-2202 *24
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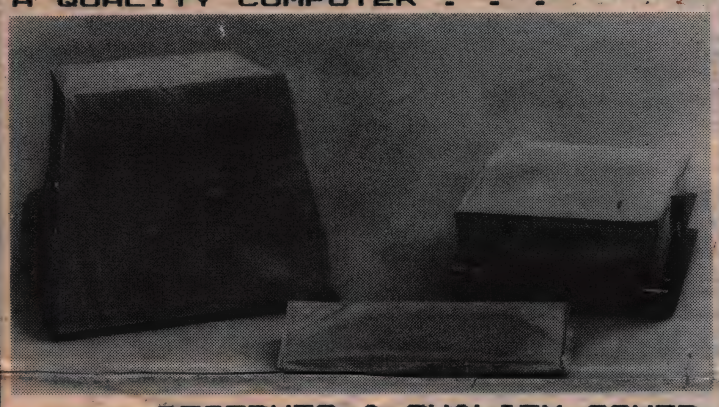

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0 (Highest Priority)	0000	0_{16} thru F_{16} (see Note 1)	0000	External: Reset (RESET Signal)
MID	0008 (see Note 2)	0_{16} thru F_{16} (see Note 1)	0001 (see Note 2)	Internal: MID
NMI	FFFC	0_{16} thru F_{16} (see Note 1)	0000	External: User-defined (NMI Signal)
1	0004	1_{16} thru F_{16}	0000	External: User-defined (INT1 Signal)
2	0008 (see Note 2)	2_{16} thru F_{16} (see Note 3)	0001 (see Note 2)	Internal: Arithmetic Overflow
3	000C	3_{16} thru F_{16}	0002	Internal: Decrementer
4	0010	4_{16} thru F_{16}	0003	External: User-defined (INT4/EC Signal; see Note 4).

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Upgrading the 99/4A

Continued from page 137

build a new board that replaces your present console to give your system new life and to keep things going in the /4A community. At this time a prototype is undergoing construction and testing using the 9995; our hope is to have the machine fully debugged and both bare boards and assembled and tested systems available shortly. Since this is a learning experience for all of us, we want to show you our progress and reveal the design trade-offs when engineering a computer. Most importantly, it will introduce you to the methods and procedures used in designing hardware for digital electronics which will become necessary for those people who will want to keep their 99/4As alive and healthy for the future. Until we are satisfied that we have a product that works with high-reliability we will not release the product to the public, so please hold off on requesting information on when the system will be available—when it's ready it will be announced and advertised. Right now our intentions are to inform the /4A community of what activities are happening. Right now, this project holds a lot of promise.

Next month: The system overview. ●

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SINGLE SIDED SOFT SECTOR	FD34-1500	$2.34	$2.25	$2.16
8 " DOUBLE DENSITY	VERBATIM P/N	10-40	50-90	100 -
DOUBLE SIDED SOFT SECTOR	DD34-1501	$3.06	$2.94	$2.82

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DOUBLE SIDED 10 SECTOR	MD550-10	$2.68	$2.58	$2.48
DOUBLE SIDED 16 SECTOR	MD550-16	$2.68	$2.58	$2.48
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SINGLE SIDED 16 SECTOR	MD577-16	$3.38	$3.25	$3.12
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Randy's Ravings

by Randy Holcomb

Well, it's a New Year, and that means resolutions. My resolution is to try and dig up even more information to make using your 99/4A a more pleasurable experience. Now on to this month's column and its contents: More TSG Software reviews and a look at sector-copying software, plus the latest TI News.

Other TSG Software: In a previous column I reviewed some software from Technologies Support Group of Spencer, MA., most notably the Pro-Mod and Multi-Sort packages. Both of these packages I found useful in their own peculiar way. Sektch-it, TSG's cellular-based graphics program, isn't easy to use, compared to the bit-mapping "Draw-a-Bit" from Data Force. Let's face it - it's easy to do GOOD graphics in Basic but if you can master graphics techniques in assembler, you're far better off, especially bit-map mode. I could not honestly get excited with Sketch-It. Along similar lines, the same goes to Auto-Type, even though its direct-output mode I find quite useful. The same effect can be achieved with a quick-and-dirty Basic program, combined with the fact that TI-Writer does such a nice job and is perhaps the most popular piece of software that TI ever introduced. Even today, TI-Writer is still readily available at a nominal price. As for all other software houses, the formula for those who want to succeed is to write something that is unique and that people want. Price it reasonably, and give good support. It's rare to find any one company that gives you all of the above.

Sector Copiers. In the last year, we have seen a plethora of software that makes backing up your diskettes a breeze rather than a hassle. The majority of this new-found wealth can be found in programs that backup disks by sector-copying rather than copying a disk file by file. Sector copying involves reading the diskette in its native storage mode (the sector) and writing the data back out in the exact same position on the backup. The advantages of sector copying is that the backup looks exactly like the source diskette (some of the more euphemistic terms are called cloning the disk or making a mirror-image of the disk). The other advantage is that the selection, Super-Duper takes over and prompts you for the parameters needed to perform the requisite function. Oddly enough, it will allow a value of drive zero, which will cause a program error during execution (anybody care to take a crack at WHY they allowed a drive zero as a valid drive number? I haven't the foggiest).

Super-Duper will format the destination disk automatically if an unformatted disk is used as the copy. Super-Duper's operation is just plain and simple - nothing fancy, it just does the job. Suggested price is around $30-35.

Floppy-Copy. This utility goes all out as far as utility goes: a built-in help file, a cataloger, a disk initializer, and of course backing up your diskettes. It also has a nasty protection scheme that revolves around some form of funny sectoring which caused the first release of Floppy-Copy to fail when using it with the CorComp DSDD Controller (this has been fixed and it does work properly with the CorComp Card). Floppy-Copy runs thru sector copying is fast - typically a sector backup runs 3 to over 10 times faster than a file-level backup. The disadvantage with a sector backup is that if the disk has a large number of small open gaps in its free disk area, a sector copy will not attempt to compress the disk and move all the free sectors together (a file level copy from a source disk to an empty disk will achieve the above effect).

Since the discovery of the sector I/O routines in the disk DSR, many diskette-backup programs have sprung up: "Super-Duper" from Navarone Industries; "Floppy-Copy" from the Soft-Spot, and "MassCopy," a FREEWARE-type program written by Stephen Lawless. It should be noted that all of these utility programs require an expanded system with disk (obviously) and 32K of memory. And now, a look at each of the programs.

Super-Duper. To use the software, you plug in the Super-Duper cartridge (an 8K Romox cartridge) into the GROM port of your console. You will be presented with 3 selections: TI Basic, Duplicating disks and Verifying disks. After making

Continued on page 140

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Randy's Ravings
Continued from page 139

the Editor/Assembler, Mini-Memory or TI Extended Basic. After the initial load, it invokes its copy-protection check; once it's past that it proceeds to bring up a welcome screen (a pixel image of a floppy-copy building?!) and then drops you into a help-screen to ask for help. If you ask for help, a sub-menu appears and asks for the sub-menu item to select from. The actual main menu consists of cataloging, initializing and backing up the diskette. It can support multiple backups (making 2 backups at the same time if you have 3 drives).

MassCopy. Stephen Lawless of 2514 Maple Ave., Wilmington, DE 19808 took a bold step when he released MassCopy into the FREEWARE world. FREEWARE involves the release of software by the original author (who normally holds the copyright on the work) on a concept whereby if a recipient finds the software of value, a "donation" is made to the original author; whereby, the author places his/her name on a mailing list and sends them the latest version of the program (including documentation and updates to the documentation). In Stephen's case, his return hasn't been all that successful. In a letter I received with his latest version, he has had only .5% response since he released the original many months ago. The latest version of MassCopy acts much like Floppy-Copy except that it has no cataloging feature but can (and will) take advantage of the Foundation 128K card if installed on the system for assisting in the copying. The display that MassCopy uses is informative to say the least - it not only shows you what is going on but takes advantage of color as well to inform you of its operating mode (reading, writing, etc.). At present, Stephen is asking a $10 donation for anyone who finds his program useful enough that they would use it.

Going head-to-head. In terms of price, MassCopy wins this battle - it's free (that is, if you don't make a donation to the author) with Super-Duper being the most expensive at over $30 (but it is in a cartridge, so it's impervious to a good magnetic pulse!). Only Super-Duper offers a verify command which reads both the source and object disks and compares the two; Floppy-Copy and MassCopy just have the standard read-after-write verify provided by the disk controller. Both MassCopy and Floppy-Copy provide help files on the disk, Super-Duper is very Spartan in this regard. Super-Duper and Floppy-Copy will not backup copy protected disks; MassCopy gives you a warning message but allows them to be backed up anyway. If you have the CorComp card, having a sector-copier utility is somewhat questionable, especially with the Turbo Option enabled. Really, you don't need one if you have the CorComp card, but if you have the TI (or Myarc, see the News below!) controller, you may want to look at any of the above utilities to make your floppy worries a little easier.

TI News. The Digital Systems Group scored a major coup with their new Explorer machine. Not your typical PC, this beast sports Lisp, megs of memory, and a $50,000 price tag. It's designed for work in Artificial Intelligence. Nary a week went by when MIT (a big Artificial Intelligence research facility) placed a 200-unit order for the systems. Later on, it was learned that a number of the 200 machines were donations made by TI to MIT. Regardless, this places TI in a new area that they are going to aggressively pursue.

Myarc, who makes the Winchester disk system for the 99/4A, is now shipping their DSDD disk controller. Unlike the initial problems that plagued the CorComp controller, the Myarc controller works with the DM II cartridge and comes in a genuine TI clam-shell case. And speaking of CorComp, it has been learned (though unconfirmed) that they have filed for protection under Chapter 11. CorComp has stated that they are still around and will honor all orders. For those of you who have CorComp products and need repair, I'd strongly suggest that (given the current company position) you call CorComp direct and get an RA number from them when shipping a defective unit instead of going through your dealer (unless your dealer will trade even up with you on your products).

T99 Update. Due to a slip-up (unintentional) on my part, the character set and a few other items are missing in the listing that the Computer Shopper is providing. To rectify this, arrangements are being made to also distribute the source code on disk; watch this space for further details. For people who subscribe to CompuServe, I have uploaded the complete source code up the CompuServe where it can be downloaded into your computer. The file is called T99.ASM and can be found in the XA2 Reference Library of the TI Forum (G PCS27 at the menu prompt). In addition, due to the many requests for information on modifying the program, a forthcoming article will go into detail on how to upgrade T99 to capture to disk/printer as well as other topics.

The following addresses refer to software companies mentioned in the above article. For those addresses not given, contact your local TI dealer for more information.

Myarc, Inc.
241 Madisonville Road
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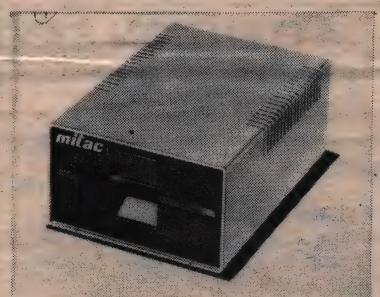

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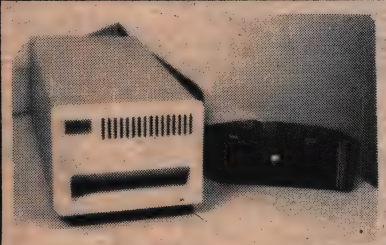

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TIMEX-SINCLAIR

Timex Sinclair Survival Column

by Mark L. Fendrick

One of the differences between the Sinclair computers and the rest of the low-cost lot is their ability to SAVE all of the data along with the program itself. In fact, on the T/S 1000/1500 computers, that is the only way in which you can SAVE and LOAD your data without writing a machine code routine. However, with the very slow cassette interface on these computers, especially if you are using an expanded memory, LOADing and SAVEing seems to take forever. If you have added a 64K memory expansion board, and have utilized all the available memory, SAVEing (as well as LOADing) takes almost a half hour! This could discourage all but the most diehard computerists. A few systems were introduced to alleviate this drawback—most notably Q-Save (a hardware and software package) and FastLoad (software only). Both of these packages speed up the process to a bearable level.

When Sinclair Research developed the ZX Spectrum, they retained the ability to SAVE the program and data together, but also included a number of new SAVEing capabilities. (The cassette interface was also improved and made faster.) Now the T/S 2068 contains these abilities, which we will discuss here.

One of the first commands you notice on the T/S 2068 which is not on the earlier models is VERIFY. On the T/S 1000/1500 the only way to verify a SAVE is to clear the memory and try to LOAD it back in. Unfortunately, if the SAVE is not good, you have no way to reSAVE it and have lost everything. You could make multiple SAVES and hope that at least one of them is good, but due to the very slow interface, this takes too long to be practical. With the T/S 2068, after a SAVE you can play the tape back, and after entering VERIFY "filename" or (VERIFY" ") the computer checks the cassette input byte for byte against the current version in memory. If it matches you see 0 OK, 0:0, otherwise, you get a TAPE LOADING ERROR message. Your original program and data is left unchanged in memory, allowing you to repeat the procedure until you get a SAVE that does verify.

The T/S 2068 allows you to SAVE a number of items separately from the program by way of modified SAVE statements. There are six SAVE statements given in the T/S 1068 manual (Appendix A: Review of T/S 2000 BASIC). They are:

SAVE*f*

Saves the program and variables.

SAVE*f*LINE*n*

Saves the program and variables so that if they are loaded there is an automatic jump to line *n*.

SAVE*f*DATA()

Saves the numeric array.

SAVE*f*DATA$()

Saves the character array $.

SAVE*f*CODE*m,n*

Saves *n* bytes starting at address *m*.

SAVE*f*SCREEN$

SAVE*f*CODE 16384,6912 (The display file) where *f* = the name of the file.

Let's take a look at each one of these individually.

SAVE*f*LINE*n* is generally the same as the basic SAVE*f* command which is identical on all the models of Sinclair computers. The difference lies in the way the two models respond after LOADING a program. On the T/S 1000/1500 computers if the SAVE command is part of a program, it LOADS and then executes the program line following the SAVE command. In this manner programs can be saved in such a way that they may be self-starting. On the T/S 2068, things work differently. A SAVE command within a program will not cause the next line to be executed automatically when LOADed. You can, however, specify a starting line number by using the SAVE*f*LINE*n* form, where *n* is the line number to be executed when the program is LOADed. From within a program this can be used to cause the program to start from any point within that program, such as a main menu, so as not to have to start from line one. From command mode, this can be used to SAVE a program so it will be self-starting in the following form:

SAVE "progname" LINE 1

where progname is ten characters or shorter, and line 1 is the first line to be executed. Both of these SAVE commands create files which are LOADed using LOAD "progname" or just LOAD "".

So far, the SAVE commands we have discussed SAVE both the program and data together as in the T/S 1000/1500. The next three SAVE commands are unique to the T/S 2068 (and ZX Spectrum) and SAVE specified data separately from the program. In order for this data to be SAVEd it must be in the form of an array, so if you are going to use this method, make sure that all the variables to be saved are in array form. (An array of a single element is perfectly acceptable.) Try entering the following short program:

```
1000 DIM a(15)
1010 FOR F=1 TO 15
1020 INPUT "Enter # ";a(F)
1030 PRINT "ENTRY #";F;"--";a(F)
1040 NEXT F
1050 SAVE "test" DATA a()
```

This program will allow you to enter an array of 15 elements which you will then SAVE under the name "test." (Note: DATA is the keyword on the D key in extended mode.) Once that is done, enter NEW to wipe everything clean, and then enter this program:

```
1000 DIM b(15)
1010 LOAD "test" DATA b()
1020 FOR F=1 TO 15
1030 PRINT "ENTRY #";F;"--";b(F)
1040 NEXT F
```

As you see, the entries you made and SAVEd in the first program were entered into the second program. You will notice that the variable in the second program is named *b* while the variable that we SAVEd is named *a*. It is not necessary that data is LOADed using the same name that it was SAVEd with, thereby giving you a great deal of flexibility. Using this procedure does not affect the program or the data in either of the programs above, except if there had already been entries in the array when the data was LOADed. Had that been the case, the old data would have been overwritten by the data you LOADed. In this manner you can pass data between programs. Have you ever had a program which you wrote, but due to lack of memory you could not have all the applications you had envisioned? Using this (and the following) SAVE techniques, you can write the program in more than one part and pass this information between the parts. At the beginning of each of the parts LOAD the arrays from the data tape, and instead of using the basic SAVE statements use these selective SAVE statements. You will find this more efficient since you do not have to SAVE the program at all. This can be used with

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Continued from page 141

single or multi-dimensional arrays.

The same procedure can be used for string (character) arrays. Try this:

```
1000 DIM a$ (15,10)
1010 FOR F=1 TO 15
1020 INPUT "Enter String: ";a$(F)
1030 PRINT "ENTRY #";F;"--";a$(F)
1040 NEXT F
1050 SAVE "test"DATA A$()
```

As you can see, the procedure is the same as in SAVEing a numeric array, except for the $. To reLOAD this array use the following program:

```
1000 DIM z$(15,10)
1010 LOAD "test"DATA z$()
1020 FOR F=1 TO 15
1030 PRINT "ENTRY #";F;"--";z$(F)
1040 NEXT F
```

Notice the difference in the directory listing when you LOAD each of these test files back into your computer. The first ones we discussed will show up as:

Program: progname

The first statement using the DATA Keyword would look like this in the directory:

Numeric array: test

while the string array statement reLOADS like this:

Character array: test

This is the reason that the T/S 2068 records a header before the actual file. Each distinct type of file requires its own LOAD statement before it will be accepted by the computer, so there is no chance of accidentally LOADing the wrong type of file. You must, however, be careful if you have a number of similar files end to end. This is why you should always use the file name when reLOADing these files rather than the null set (""). You should name each file in such a manner that is descriptive of the information you are SAVEing. If you are not sure what files are on a particular tape, you can type; LOAD "nonsense" (or any name that you know is not a real file name) and let the tape run. You will get a full directory of that cassette, which will not affect anything you may currently have in memory. You can even use the COPY command to make a copy of this directory to keep with the tape.

In November we discussed a method of saving data in a REM statement. Although directions were given for both the T/S 1000/1500 and the T/S 2068, the procedure is unnecessary on the T/S 2068 due to the next SAVE statement. This is used to write a section of memory directly to tape. This is most often used to SAVE and LOAD machine code routines. In order to do this, you need to know two things; the starting address of the routine (or beginning of the storage area if you have POKEd data into this program), and the length (in bytes) of the routine or file. You should also be familiar with the CLEAR command as you will have to set aside protected RAM for the data. This command is used as follows:

CLEAR *address*

where *address* refers to an address in RAM. When used like this it has the effect of lowering RAMTOP to the specified address, and giving you an area protected from being overwritten by BASIC. To utilize the maximum RAM available enter CLEAR 65535. This will move RAMTOP to the top of the RAM actually in your T/S 2068—but will wipe out the user defined graphics area. After typing in CLEAR 60000 [ENTER], type in and RUN this program:

```
1000 FOR F=60000 TO 60050
1010 POKE 23692,2
1020 INPUT "ENTRY? ";A
1030 PRINT F;"-";A
1040 POKE F,A
1050 NEXT F
1060 SAVE "numbers"CODE 60000,50
```

If you are wondering about line 1010, this is a POKE to cause the screen to scroll automatically without asking scroll? and waiting for your INPUT. The number stored in this location tells the computer how many lines to scroll before

Continued on page 152

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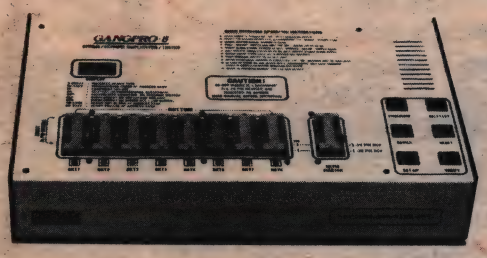

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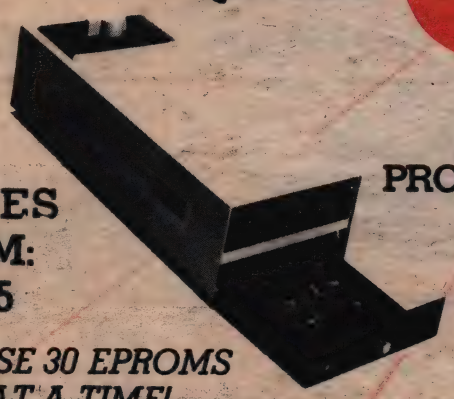

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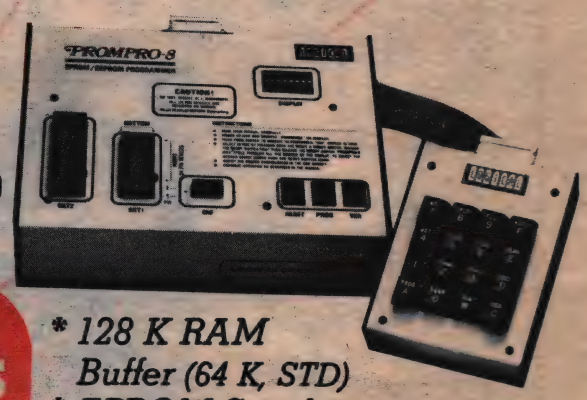

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					AX2732A-2	4096 × 8 (200ns)	13.90	13.30	12.70
AX1702	256 × 4 (1us)	4.90	4.65	4.40	AX2732A	4096 × 8 (250ns)	9.90	9.40	8.90
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AX2758	1024 × 8 (450ns)	5.90	5.60	5.30	AXTMS2532	4096 × 8 (450ns)	5.90	5.60	5.30
AX2716	2048 × 8 (450ns)	3.90	3.70	3.50	AX2764-3	8192 × 8 (300ns)	8.90	8.45	8.00
AX2716-1	2048 × 8 (350ns)	5.90	5.60	5.30	AX2764	8192 × 8 (450ns)	6.90	6.55	6.20
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AX2732	4096 × 8 (450ns)	4.90	4.65	4.40	AXMCM68764	8192 × 8 (450ns)	24.90	23.65	22.40
AX2732-1	4096 × 8 (350ns)	8.90	8.45	8.00	AXMCM68766	8192 × 8 (350ns)	29.90	28.40	26.90

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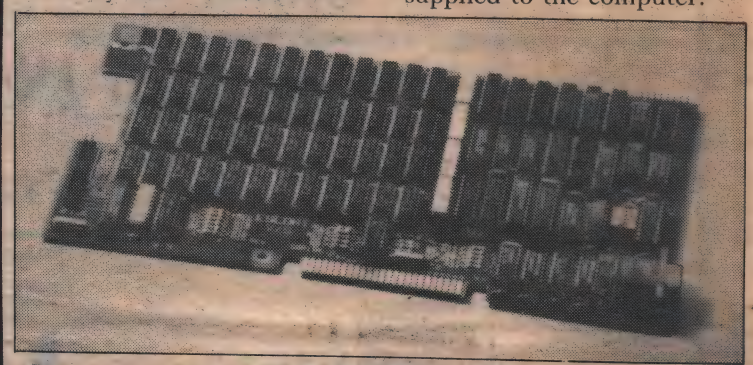
Multifunction Board For Victor 9000 Computers

Western Automation Laboratories, Inc. announces its entry into the Victor and Sirius computer products market with the Escort V/S multifunction board and product series. Western Automation designed these products to improve the performance and expand the capabilities of the Victor 9000 and Sirius computers at a very reasonable price. Victor markets the 9000 worldwide but offers the computer under the Sirius label in Great Britain.

Western Automation offers the Escort V/S in two models. Model V1 utilitizes 64K chips and features fully socketed memory from 0-384K. A 256K V1 "piggyback" expansion module raises the Victor to its full 896K capacity. Model V2 utilitizes 256K dynamic RAMs and is user-expandable from 0-1536K. A 1024K V2 expansion module mounts to the Escort V/S to allow for a memory capacity of 2560K, with all RAM over 640K being utilized as an ultra-fast RAM "disk emulator." The hardware driven RAM "disk emulator" acts much as a hard disk but is totally electronic. The absence of time-consuming mechanical parts and operations makes information retrieval almost immediate.



The Escort V/S board features a standard quadrature (mouse) interface to provide new means of cursor and program control. An optional mouse is available. The board also features an onboard SASI/SCSI* interface capable of supporting a wide variety of Western Automation computer peripherals.

Western Automation also offers a complete line of Escort hardware products including: 10 and 20 megabyte external Winchester disk drives, 60 megabyte streaming tape drives, and IBM PC compatible 5¼" floppy disk drives. The SASI interface on the Escort V/S board supports the operation of up to eight Escort series peripherals. An optional Real Time Clock/Calendar with lithium battery backup allows for the use of time-critical programs and automatically sets the system time and date when power is supplied to the computer.

Each Escort V/S board includes a MS-DOS 2.0 compatible diskette containing a quality software package from Western Automation. The software package includes sample SASI/SCSI disk drivers, format routines, memory and board diagnostics, an advanced RAM disk program, sample mouse programs, and a communications program that allows the Victor/Sirius to work as a ASCII communications terminal. The diskette also contains Real Time Clock utilities to permit setting and adjustment of the clock/calendar from the keyboard.

The Escort products are very competitively priced. An Escort V1 board with OK lists for $395.00, and a OK Escort V2 board lists for $425.00. A 1536K Escort V2 board lists for $2445.00. Many package deals (example: OK Escort, 10 megabyte Winchester drive) are available. Quantity discounts are available to qualified dealers, distributors, and OEMs. The Escort products are sold locally through authorized dealers. To locate Western Automation dealers phone the company toll free at (800)227-4637 or (303) 449-6400 in Colorado.

For further information contact: Western Automation Laboratories, Inc., P.O. Box 3438, Boulder, CO 80307.

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Saturday February 9, 1985 — 10AM to 5PM

NJ/NY/CT MICROCOMPUTER SHOW AND COMPUTER FLEAMARKET

(6th. Year!)

MEADOWLANDS HILTON HOTEL — EXHIBITION CENTER

Rte. 3 & Meadowlands Parkway, Secaucus, NJ
(near exit 16W of NJ Turnpike)

150 VENDORS OF NEW & USED COMPUTER PRODUCTS (ALL INDOORS!)

ADMISSION: Adults $6.00 & Children (5–12) $3.00

SELLER'S INFO: Vendor tables are $40.00 each without electricity, and $60.00 each with electricity. Call (201)297-2526 to reserve tables with Master Card, VISA or American Express. No tables will be sold at the door!

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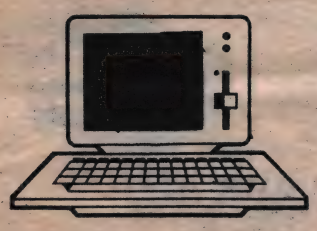
WASHINGTON, DC — BALTIMORE MICROCOMPUTER SHOW AND COMPUTER FLEAMARKET



Saturday March 9 & Sunday March 10
10:00 AM TO 5:00 PM 10:00 AM TO 4:00 PM

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NEW YORK CITY PERSONAL COMPUTER SHOW

(Fifth Year!)

Friday March 29 Saturday March 30 Sunday March 31
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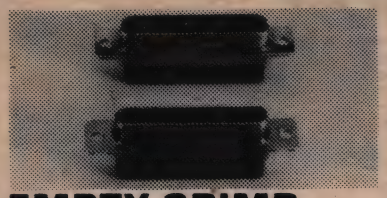
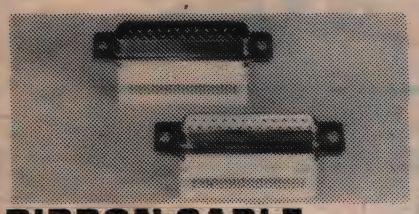
D-SERIES CONNECTORS



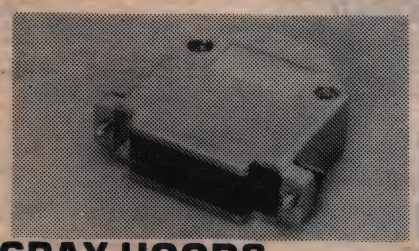
EMPTY CRIMP SHELLS

PART #	1-49	50-99	100-UP
	PRICE/QTY		
C9P	0.86	0.78	0.72
C9S	0.90	0.82	0.75
C15P	0.88	0.80	0.73
C15S	0.92	0.84	0.77
C25P	0.90	0.82	0.75
C25S	0.94	0.85	0.78
C37P	1.04	0.95	0.87
C37S	1.06	0.96	0.88
C50P	1.14	1.04	0.95
C50S	1.20	1.09	1.00



RIBBON CABLE CRIMP ON D CONNECTORS

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDC-9P	4.00	3.64	3.33
IDC-9S	4.28	3.89	3.57
IDC-15P	4.86	4.42	4.05
IDC-15S	5.24	4.76	4.37
IDC-25P	5.24	4.76	4.37
IDC-25S	5.82	5.29	4.85
IDC-37P	8.22	7.47	6.85
IDC-37S	8.92	8.11	7.43
IDC-50P	19.71	18.40	17.25
IDC-50S	23.87	20.46	19.09

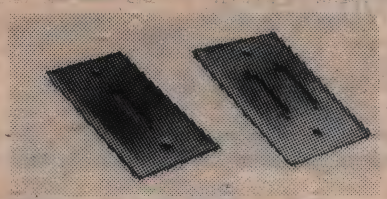


GRAY HOODS

PART #	1-49	50-99	100-UP
	PRICE/QTY		
GH-9	1.02	0.93	0.85
GH-15	1.04	0.95	0.87
GH-25	1.06	0.96	0.88
GH-37	1.18	1.07	0.98
GH-50	1.32	1.20	1.10

CONTACTS FOR EMPTY CRIMP SHELLS

PART #	1-99	100-999	1000-UP
	PRICE/QTY		
CP20P	0.08	0.07	0.06
CP20S	0.10	0.09	0.08



RS—232 DB—25 WALL PLATES

metal wall plates

PART #	1-24	25-49	50-UP
	PRICE/QTY		
WP-1	2.95	2.66	2.36
WP-2	3.45	3.11	2.76

P.C. MOUNT STRAIGHT

PART #	1-49	50-99	100-UP
	PRICE/QTY		
P9P	1.58	1.44	1.32
P9S	2.60	2.36	2.17
P15P	2.10	1.91	1.75
P15S	3.66	3.33	3.05
P25P	2.90	2.64	2.42
P25S	4.38	3.98	3.65
P37P	4.30	3.91	3.58
P37S	8.18	7.44	6.82
P50P	5.50	5.00	4.58
P50S	10.70	9.73	8.92

SOLDER POT TYPE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
CEN-36P	4.00	3.64	3.33
CEN-36S	4.20	3.82	3.50
CEN-36SCM	3.50	3.18	2.92

CONTACT EXTRACTOR TOOL

extracts contacts from D crimp shells

PART #	PRICE/QTY PRICE
EX-1	2.75 EACH

RS—232 GENDER CHANGERS

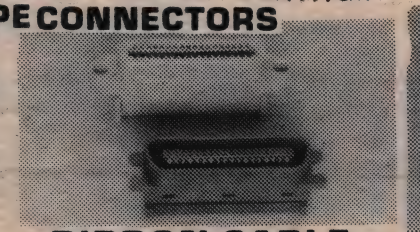
PART #	1-9	10-UP
	PRICE/QTY	
AGC-M	9.95	7.95
AGC-F	9.95	7.95

P.C. MOUNT RIGHT ANGLE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
R9P	2.54	2.31	2.12
R9S	2.60	2.36	2.17
R15P	2.98	2.71	2.48
R15S	3.10	2.82	2.58
R25P	3.72	3.38	3.10
R25S	3.00	2.73	2.50
R37P	4.70	4.27	3.92
R37S	4.90	4.45	4.08
R50P	9.72	8.84	8.10
R50S	11.00	10.00	9.17

SOLDER POT TYPE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
CEN-36P	4.00	3.64	3.33
CEN-36S	4.20	3.82	3.50
CEN-36SCM	3.50	3.18	2.92



RIBBON CABLE CRIMP ON

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDC-36P	6.00	5.45	5.00
IDC-36S	7.90	7.18	6.58

CRIMPING TOOL

for crimping D series contacts

PART #	PRICE/QTY PRICE
CT-1645	79.95 EACH

D-SERIES HARDWARE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
MDH-1	0.55	0.45	0.35
FDH-1	0.85	0.75	0.65

SOLDER POT TYPE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
9P	1.44	1.31	1.20
9S	1.94	1.76	1.62
15P	1.96	1.78	1.63
15S	2.60	2.36	2.17
25P	2.20	2.00	1.83
25S	2.80	2.55	2.33
37P	4.00	3.64	3.33
37S	5.20	4.73	4.33
50P	5.08	4.62	4.23
50S	7.80	7.09	6.50

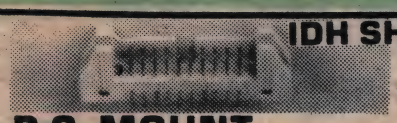
BLACK AMP HOODS

PART #	1-49	50-99	100-UP
	PRICE/QTY		
AH—25	1.30	1.18	1.08

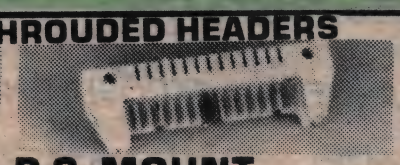
SHEILDED HOOD

PART #	1-49	50-99	100-UP
	PRICE/QTY		
SH-25	1.35	1.23	1.13

RIBBON CABLE CONNECTORS



IDH SHROUDED HEADERS



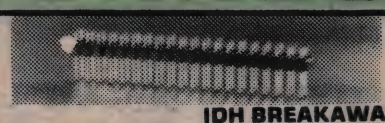
P.C. MOUNT RIGHT ANGLE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10R	0.80	0.72	0.64
IDH-20R	1.20	1.08	0.96
IDH-26R	1.50	1.35	1.20
IDH-34R	2.00	1.80	1.60
IDH-40R	2.40	2.16	1.92
IDH-50R	2.95	2.66	2.36
IDH-60R	3.86	3.47	3.09

P.C. MOUNT STRAIGHT

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10	0.80	0.72	0.64
IDH-20	1.15	1.04	0.92
IDH-26	1.50	1.35	1.20
IDH-34	1.95	1.76	1.56
IDH-40	2.30	2.07	1.84
IDH-50	2.85	2.57	2.28
IDH-60	3.45	3.11	2.76

.1 x .1 spacing, gold plated pins



IDH BREAKAWAY HEADER STRIPS

P.C. MOUNT STRAIGHT

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10B	0.30	0.27	0.25
IDH-14B	0.42	0.38	0.35
IDH-16B	0.48	0.44	0.40
IDH-20B	0.60	0.55	0.50
IDH-26B	0.78	0.71	0.65
IDH-34B	1.02	0.93	0.85
IDH-40B	1.20	1.09	1.00
IDH-50B	1.50	1.36	1.25
IDH-60B	1.80	1.64	1.50
IDH-80B	2.40	2.18	2.00

P.C. MOUNT RIGHT ANGLE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10BR	0.38	0.35	0.32
IDH-14BR	0.53	0.48	0.44
IDH-16BR	0.61	0.55	0.51
IDH-20BR	0.76	0.69	0.63
IDH-26BR	0.99	0.90	0.82
IDH-34BR	1.29	1.17	1.08
IDH-40BR	1.52	1.38	1.27
IDH-50BR	1.90	1.73	1.58
IDH-60BR	2.28	2.07	1.90
IDH-80BR	3.04	2.76	2.53

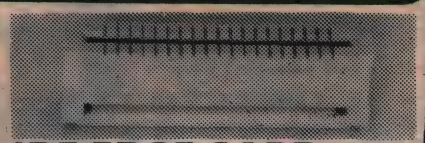
dual row .1 x .1 spacing, gold plated pins

ALTEX ELECTRONICS

RIBBON CABLE CRIMP ON CONNECTORS

IDS SOCKET TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDS-10	1.15	1.04	0.92
IDS-14	1.35	1.22	1.08
IDS-16	1.45	1.31	1.16
IDS-20	1.50	1.35	1.20
IDS-26	2.40	2.16	1.92
IDS-34	2.90	2.61	2.32
IDS-40	3.50	3.15	2.80
IDS-50	4.25	3.83	3.40
IDS-60	5.80	5.22	4.64

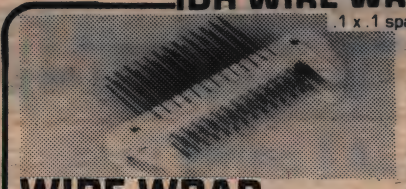


IDE EDGE CARD TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDE-10	1.90	1.71	1.52
IDE-14	2.00	1.80	1.60
IDE-20	2.25	2.03	1.80
IDE-26	2.65	2.39	2.12
IDE-34	2.95	2.66	2.36
IDE-40	3.50	3.15	2.80
IDE-50	4.25	3.83	3.40

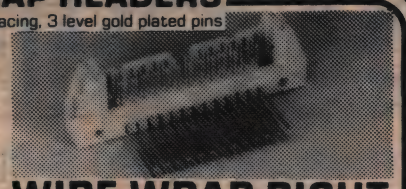
IDH WIRE WRAP HEADERS

.1 x .1 spacing, 3 level gold plated pins



WIRE WRAP STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10W	1.50	1.35	1.20
IDH-20W	2.55	2.30	2.04
IDH-26W	3.20	2.88	2.56
IDH-34W	3.75	3.38	3.00
IDH-40W	4.50	4.05	3.60
IDH-50W	5.50	4.95	4.40



WIRE WRAP RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10WR	2.45	2.21	1.96
IDH-20WR	2.60	2.34	2.08
IDH-26WR	3.25	2.93	2.60
IDH-34WR	3.80	3.42	3.04
IDH-40WR	4.65	4.19	3.72
IDH-50WR	5.55	5.00	4.44

IDP PLUG CONNECTOR

mates with IDS type connectors

PART #	PRICE/QTY 1-49	50-99	100-UP
IDP-20P	3.95	3.16	2.53
IDP-34P	4.95	3.96	3.17
IDP-50P	5.95	4.76	3.81

IDD DIP PLUG CONNECTOR

for pluging into IC sockets

PART #	PRICE/QTY 1-49	50-99	100-UP
IDD-14	1.30	1.17	1.05
IDD-16	1.65	1.49	1.34
IDD-24	2.25	2.03	1.82
IDD-40	3.90	3.51	3.16

RIBBON CABLE ASSEMBLYS

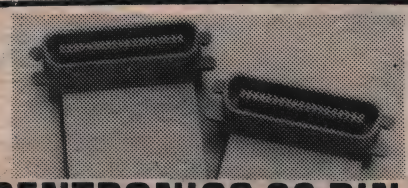
D-SERIES RIBBON CABLES

PART #	PRICE
9P-9P	8.00 + .18 per foot
9P-9S	8.28 + .18 per foot
9S-9S	8.56 + .18 per foot
15P-15P	9.72 + .30 per foot
15P-15S	10.10 + .30 per foot
15S-15S	10.48 + .30 per foot
25P-25P	10.50 + .50 per foot
25P-25S	11.10 + .50 per foot
25S-25S	11.30 + .50 per foot
37P-37P	16.44 + .74 per foot
37P-37S	16.95 + .74 per foot
37S-37S	17.80 + .74 per foot

GENDER MENDERS

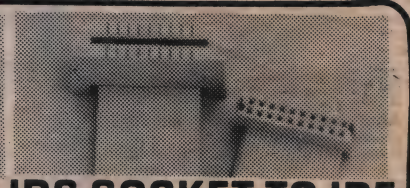
PART # GM—25	PRICE
GM-25	22.50 + .50 per foot

25 pin RS-232 cable with a male and female connector on each end.



CENTRONICS 36 PIN RIBBON CABLES

PART #	PRICE
36P-36P	12.00 + .72 per foot
36P-36S	13.45 + .72 per foot
36S-36S	15.90 + .72 per foot

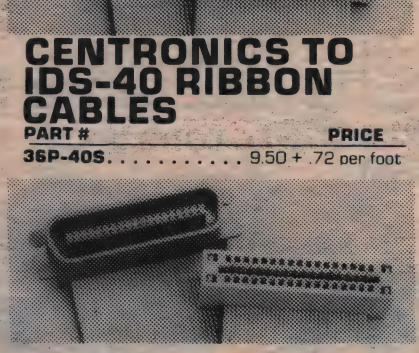


IDS SOCKET TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10S-10E	3.05 + .20 per foot
14S-14E	3.35 + .28 per foot
20S-20E	3.75 + .40 per foot
26S-26E	5.05 + .52 per foot
34S-34E	5.85 + .68 per foot
40S-40E	7.00 + .80 per foot
50S-50E	8.50 + 1.00 per foot

IDE EDGE CARD TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10E-10E	3.80 + .20 per foot
14E-14E	4.00 + .28 per foot
20E-20E	4.50 + .40 per foot
26E-26E	5.30 + .52 per foot
34E-34E	5.90 + .68 per foot
40E-40E	7.00 + .80 per foot
50E-50E	8.50 + 1.00 per foot



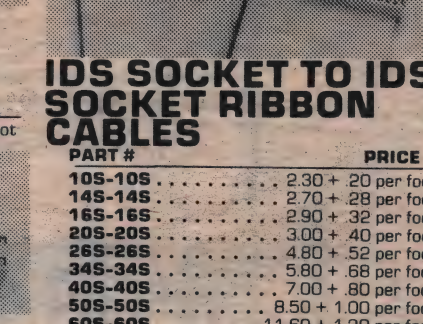
CENTRONICS TO IDS-40 RIBBON CABLES

PART #	PRICE
36P-40S	9.50 + .72 per foot

CENTRONICS TO IDE-34 RIBBON CABLES

printer cable for TRS-80 computers

PART #	PRICE
36P-34E	10.25 + .68 per foot



IDS SOCKET TO IDS SOCKET RIBBON CABLES

PART #	PRICE
10S-10S	2.30 + .20 per foot
14S-14S	2.70 + .28 per foot
16S-16S	2.90 + .32 per foot
20S-20S	3.00 + .40 per foot
26S-26S	4.80 + .52 per foot
34S-34S	5.80 + .68 per foot
40S-40S	7.00 + .80 per foot
50S-50S	8.50 + 1.00 per foot
60S-60S	11.60 + 1.20 per foot

IDD DIP PLUG TO IDD DIP PLUG RIBBON CABLES

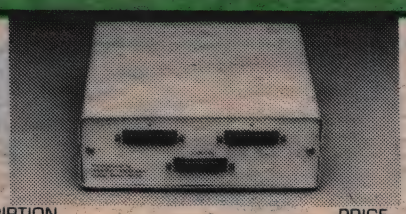
PART #	PRICE
14D-14D	2.60 + .28 per foot
16D-16D	3.30 + .32 per foot
24D-24D	4.40 + .48 per foot
40D-40D	7.80 + .80 per foot

PARALLEL PRINTER CABLES

IBM PC TO PARALLEL PRINTER

PART #	PRICE	10-UP
PPC-301-5	19.95	16.95
PPC-301-10	24.95	19.95

SERIAL/PARALLEL DATA TRANSFER SWITCHES



PART #	DESCRIPTION	PRICE
AB-25	RS-232 SWITCHBOX	88.00

switches all 25 lines; two positions for interfacing; two printers to one computer or one printer to two computers

PART #	DESCRIPTION	PRICE
AB-36	PARALLEL SWITCHBOX	138.00

switches all 36 lines two positions for interfacing two computers to one printer or two printers to one computer.

PART #	DESCRIPTION	PRICE
AB-5	RS-232 5 PORT SWITCHBOX	149.95

switches 12 lines 5 positions for connecting any one of five terminals to one serial modem or five parallel printers to one computer or vice versa.

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7416	.35
7425	.35
7441	.30
7448N	.35
7450N	.35
7454N	.35
7470N	.45
7476N	.35
DM7483N	.35
7496	.45
74109	.35
74125N	.40
74145	.50
74147	.40
SN74174N	.40
74184N	.80
74247	.35
74279	.45
54C Series	
MM54C00J	.45
SN54C10	.45
MM54C10	.45
MM54C74J	.45
MM54C1733	.65
74C Series	
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MM74C02N	.30
74C04N	.30
MM74C08N	.30
MM74C10J	.40
MM74C32J	.40
MM74C42J	.40
MM74C74J	.40
MM74C76N	.30
MM74C86N	.30
MM74C89J	2.25
MM74C154J	1.75
MM74C157J	.45
MM74C174J	.45
MM74C373N	.65
74F Series	
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74F02	.40
74F11	.40
74F32	.45
74F157	.40
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MC74HC74N	.50
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54L10J	.45
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DM74L10N	.30
SN74L12J	.30
DM74L42	.50
SN74L93N	.80
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26LS32PC	.80
54LS Series	
DM54LS00J	.60
DM54LS74J	.60
DM54LS174J	.90
DM54LS247J	.80
N54LS368J	.80
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74LS01	.35
74LS02	.35
74LS02	.35
74LS04	.35
74LS05	.35
74LS10	.35
74LS11	.35
74LS14	.40
74LS20	.35
74LS26	.35
74LS32	.35
74LS33	.35
74LS37N	.35
74LS42	.40
74LS51N	.30
74LS74	.35
74LS76	.35
74LS83	.80
74LS86N	.45
74LS93	.60
74LS95N	.45
74LS107N	.30
74LS109AN	.45
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SN74LS123	.35
74LS125	.45
74LS132	.35
74LS138	.35
74LS139	.35
74LS148N	2.55
SN74LS151	.35
74LS153	.35
74LS157	.35
74LS174	.35
74LS192	.45
74LS193	.45
74LS195	.75
74LS221	.40
74LS253	.55
74LS273N	.65
74LS280N	1.50
74LS283	.45
74LS295	.70
74LS298	.85
74LS299	.85

PART	PRICE
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74LS355	.65
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74LS374	.80
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74LS541	1.00
SN74LS688N	2.50
HD74LS669P	2.25
74S Series	
SN72S32N	.55
74S113	.55
74S138N	.55
74S374	1.25
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MC661P	.45
MC668P	.45
MC671P	.45
DM80L95J	.80
N8274F	1.75
DP8302	1.25
DP8305	1.25
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MCM14008BCP	.30
MC14012UB	.25
MC14022B	.30
MC14032	.35
MC14035	.40
MC14042B	.40
MC14043B	.40
MC14068BALR	.35
MC14069B	.30
MC14073	.35

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MC14411L	4.50
MC14511B	.60
MC14515B	.80
MC14517BAL	1.25
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MC14555BA	.30
MC14556BCP	.35
4006B	.28
CB4015BEX	.40
CD4023BE	.35
HCF4024BE	.40
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MM80C98J	.45
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10117	.55
10131	1.50
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TIP120	.18

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SJE848/MJE700	.15
2SC1921	.045
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2N2925B6	*
2N5961	*
Diodes	
EQB0-28V	.015
13V ZENER	.015
ERB28-04	.015
ERB30-13V	.015
NC102	.015
IN522	.015
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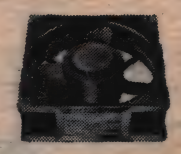

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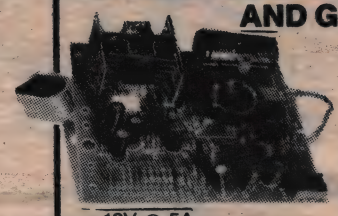

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With on/off switch.
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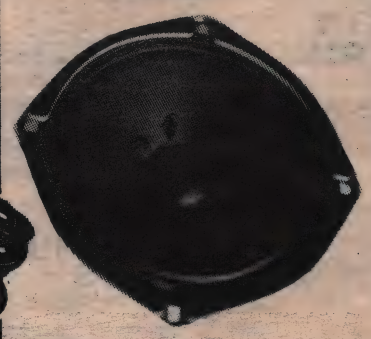

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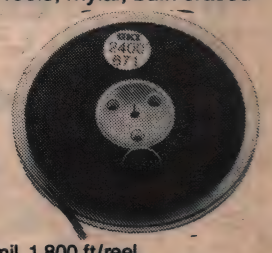

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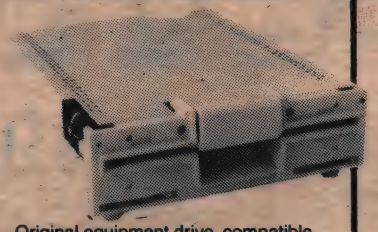
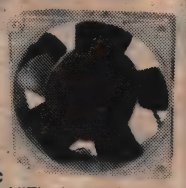


Original equipment drive, compatible with Apple 2e, 2+, and 2c.

$139.50 RFE

B. 115 CFM MUFFIN* FAN



Metal frame with 5 high impact plastic blades. For cooling HiFi, electronic equipment, computers, etc. Mounts for intake or exhaust. 115 VAC, 60Hz. Dim: 4 1/16" x 1 1/2" D.

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C. 3¼ MINI FAN

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D. 150 CFM SUPER MUFFIN* FAN

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E. RF POWER LINE FILTERS

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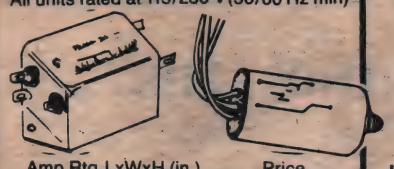
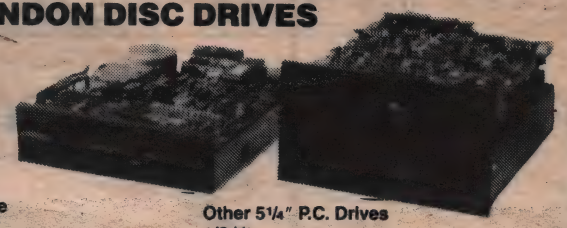


	Amp Rtg	LxWxH (in.)	Price
E1-	3	5/16, 2, 1 1/8	$3.00
E2-	8	1 3/8, 5 1/2, 1 1/2	$3.50
E3-	10	4 1/2, 3, 2 1/4	$4.00
E4-	20	5 1/4, 2 3/4, 1 1/2	$4.50
E5-	30	8 3/16, 6, 2 1/4	$5.00

5¼" TANDON DISC DRIVES



IBM Compatible
1/2 Ht.:

F.	TM55-2	DS/DD	$179.00
G.	TM100-1	SS/DD	99.50
H.	TM100-2	DS/DD	159.00

Other 5¼" P.C. Drives
1/2 Ht.:

J.	TM55-4	DS/Quad	$179.00
K.	TM100-4	DS/Quad	179.00
L.	TM101-4	DS/Quad	199.00

M. 48 KEY KEYBOARD

Replace the membrane keyboard on your Timex/Sinclair Z-81/1000 with this brand new "big computer" keyboard from Texas Instruments. Simple to install—complete instructions and schematic included.

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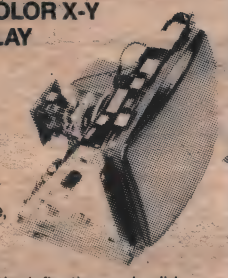
N. 19" COLOR X-Y DISPLAY



Originally designed for use in Atari coin-operated games. Contains a 19VLUP22 3-gun color tube, focus and brightness controls. Has electromagnetic deflection and solid state circuitry with three "Z" amp inputs (red, green, blue). Ideal for arcade replacement or, with the addition of external circuitry, for color graphics display. Manual included.

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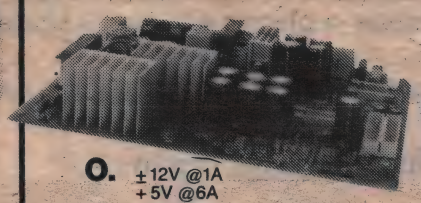
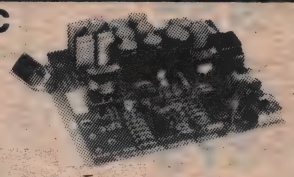


O. ±12V @1A
+5V @6A
−5V @1A
Dim: 9½" x 7"

$29.95 NEW

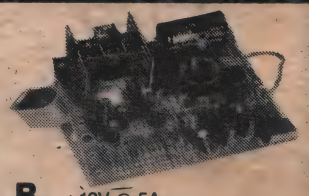
P. +24V @2.2A
−12V @.17A
+5V @3A
Dim: 7⅜" x 6⅛"
INPUT: 115/230V 50/60 Hz

$19.95 NEW



Q. +12V @.350A
+5V @1.2A
−5V @.12A
Dim: 4⅛" x 4⅝"
Input: 115VAC when used with AC wall transformer (supplied)

$6.95 NEW



R. +12V @.5A
+5V @.05A
−5V @.04A
Dim: 3¾" x 4¾"
INPUT: 115 VAC when used with AC wall transformer (supplied)

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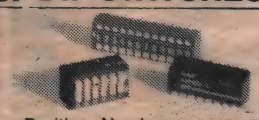
S. DIP SWITCHES



	Position	Number	Price
S1-	4	CTS 206-4	.50
S2-	5	CTS 206-5	.55
S3-	6	Alco DBS-6	.65
S4-	8	C & K	.80
S5-	8	Amp 435802-1	.80
S6-	12	SAE	.95

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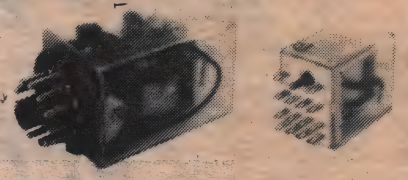
U. RELAYS



KAP/KRP type
3PDT @ 5 amp

U1.	115VAC	$3.75
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U3.	24VDC	$3.00
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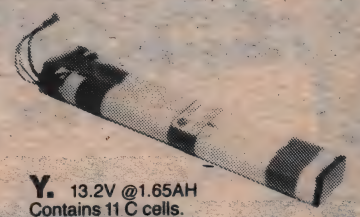

Y. 13.2V @1.65AH
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Portable computer battery back up.
Mfr. GE # 41B03JBB00101

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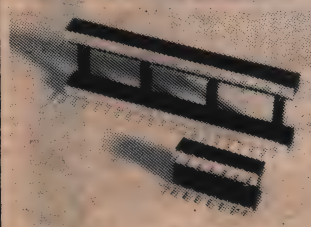

Pin Count	Profile	Price
AA1- 14	ST	.12
AA2- 14	LP	.12
AA3- 16	ST	.13
AA4- 16	LP	.13
AA5- 20	ST	.27
AA6- 22	LP	.27
AA7- 24	LP	.27
AA8- 24	ST	.27
AA9- 28	LP	.32
AA10- 40	LP	.39
AA11- 46	ST	.40

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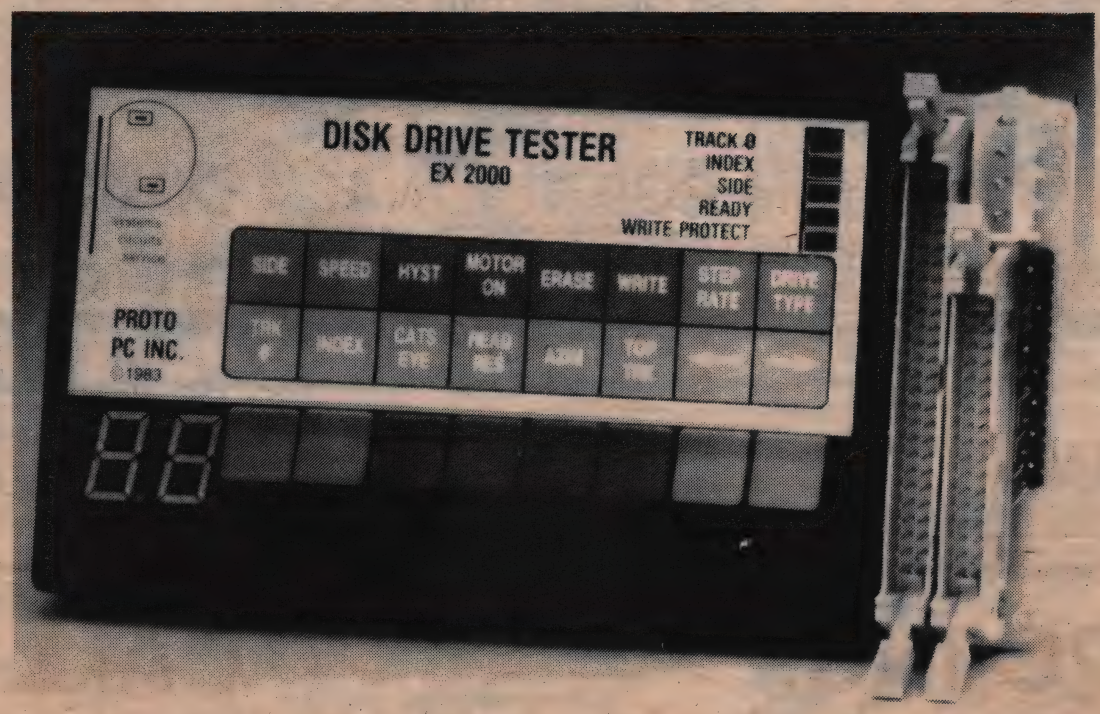

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Timex Sinclair
Continued from page 142

asking. Any number greater than 1 (with 255 being the largest) will cause an automatic scroll, and reduce the value in that address by 1. When it reaches the value of 1 it will again ask **scroll?** when the screen is out of room.

Line 1060 contains the SAME command you use for this type of data. CODE is the keyword found on the I key in the extended mode. The 60000 is the address where the SAVE will start, and 50 is the number of bytes to be SAVEd. When you reLOAD the data, you have a choice of two ways to do it.

LOAD "filename"CODE

or

LOAD "filename"CODE *address*

The first statement will reLOAD the SAVEd data to the same location it was SAVEd from, while the second statement allows you to specify an alternate location where *address* is the desired location.

Turn your computer off and then back on and enter the following program:

```
1000 CLEAR 60000
1010 LOAD "numbers"CODE
1020 FOR F=60000 TO 60050
1030 PRINT F;"-";PEEK F
1040 NEXT F
```

You will see that the directory lists this as

Bytes: numbers

when it reLOADS your data.

The final SAVE statement is actually a specialized form of the previous one, since it SAVEs 6912 bytes starting at location 16384—the current screen display file. Try this:

```
1000 LET P=0
1010 FOR F=1 TO 21
1015 PAPER P
1020 PRINT "          (32 SPACES)          "
1030 LET P=P+1:IF P>8 THEN LET P=0
1040 NEXT F
1050 PRINT AT 12,0;FLASH 1;PAPER 7;"----------THIS IS A
TEST----------"
1060 SAVE SCREEN$ "colors"
```

When this is complete, type NEW [CENTER] and then simly enter:

LOAD SCREEN$ "colors"

Now watch as the computer rewrites the screen in sections—one pixel line at a time! This clearly demonstrates the unusual way the T/S 2068 stores the screen, and why you cannot simply POKE a character to the screen as you can do on the T/S 1000/1500. You can also see the attributes (color, FLASH, etc.) being written to the screen.

Now let's all go back to the drawing board and streamline those programs. ●

Graphics Tablet For TS2068

The Zebra Graphics Tablet for the TIMEX/Sinclair TS2068 Computer is a complete hardware and software package for the Timex/Sinclair TS2068 Computer. It allows you to draw high-resolution pictures more easily than ever before. The package consists of a Graphics Tablet manufactured by Koala Technologies, Inc., ZebraPainter Cassette software, and the Zebra Graphics-Interface.

The tablet features a rectangular touch sensitive drawing area upon which you can draw using a finger or the supplied plastic stylus. It also features two independent control buttons for programmable functions.

The ZebraPainter software is written in machine code and fully utilizes the TS2068's Extended Color Mode for the highest possible color resolution. You can select paper, ink, and border colors, draw and erase freehand with fine or broad strokes, designate precision circles and lines, enter text, work on two screens at once, save and load screens to tape, and print screen images to your Timex printer.

The Zebra Graphics-Interface attaches to the rear of the TS2068 and provides an expansion connector to allow piggybacking other peripherals. Two standard 6-pin DIN connectors can accommodate the Zebra Graphics-Tablet, Analog Joysticks, and much more.

The price for the above items including a 32-page owners manual, ZebraPainter Quick Reference Card, and a 90-day limited warranty, is $119.95 plus $3 shipping.

For more information, contact Zebra Systems, Inc., 78-06 Jamaica Avenue, Woodhaven, NY 11421.

Mention that you read it in Computer Shopper. ●

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One Year Warranty $995

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CP/M

Getting In Deeper With DUU, CP/M Hacker's Tool

by H.L. Nieburg

Applications software and file utilities keep the computer user at an artificially sanitized arm's length from the reality inside the chips. Beneath the pristine surface is a wholly different world, made up of sectors and CPM groups, hexidecimal code, machine codes, and a multiplicity of strange addresses. There is a public domain piece of software which allows the neophyte to plunge into that nether place.

The best way to make the journey on any CP/M computer is with the aid of Ward Christensen's wonderful contribution known as DUU.COM (Disk Users Utility). It can be found on many bulletin boards and can be down-loaded free of charge, given or traded freely, and otherwise is widely available. It is true that the DDT (Dynamic Debugging Tool) provided as a standard utility on CPM system disks can do many of the same things, but not nearly so well. The latter is much more difficult to master, more awkward to use, and considerably less powerful.

Use of DUU offers glimpses of how a computer really works, what the architecture of memory and operations looks like, and how the disks store data and programs; in addition, it becomes possible, with minimum hacker skills:

To read a disk sector by sector,

to copy and move sectors,

to change program defaults without an "Install Program,"

to edit logos and proprietary serial numbers,

to read secret messages left by programmers for each other,

to re-create crashed directories,

to install or delete an "++EOF++" (end-of-file) to a damaged file,

to unerase files or parts of files,

to explore the debris of extant data on overwritten disks,

to examine the contents of a PW.SWP file for lost data,

to copy software from hard disk "user area" to other "user areas" or to a floppy drive, and other such magic powers.

Many people have seen the DUU.COM file and perhaps squinted at its opening display, not knowing where to go from there. It's not as forbidding as it looks. Begin by typing "DUU" at the A>. The following display comes up:

```
DISK UTILITY VER 7.5 +
MODS 10/23/81
Universal Version
Type ? for help
Type X to exit
:
```

The DUU prompt is a (":") colon. Log to the disk drive desired by typing "L" followed by the letter of the drive (A,B,C, etc). Then for an internal directory of a kind you've never seen before, type an "M." Here is an example:

```
00-0B    00 PIP      .COM  00
0C-11    00 SETDISK  .COM  00
12-17    00 SWEEP    .COM  00
18-27    00 ARCHGET  .COM  00
28-2B    E5(CLS      .COM) 00
2C-AE        ++FREE++
```

Note the directory contains normal information, plus, in parentheses, erased files, and the location and size of the files expressed in CPM group clusters; files that are longer than sixteen groups appear more than once to tell the disk drive where to jump for continuation; note also that "free space" (unallocated groups) is also shown.

What is a CPM group? Briefly we can sketch the architecture of the disk. In addition to tracks, the disk is formatted into sectors of 128 bytes each. For the CPM operating system, clusters of 16 sectors each are the most important benchmarks. When locating or writing a file, the drive always goes to the first sector of a free group and begins reading or writing there. The hexidecimal numbering system is used to count CPM groups. The hex system is a base 16 code that counts A through F between 9 and 0, as follows:

0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F,0.

All information on the disk is coded in this system, including machine code operations and ASCII data. MBASIC provides a simple command to print out hex equivalents of ASCII and decimal numbers.

At the same time that a file is written from memory to disk, a record is kept in the directory of what is on the disk, where it is, and much space it takes. The directory information is always contained at location 00, and occupies up to 16 sectors. Since, each directory item is allocated two lines, or 32 bytes, four file names to each sector, it is obvious why CPM permits a maximum of 64 directory items on any single disk.

One may use DUU to go directly to view and/or edit the listings. DUU permits easy access to any CPM group with the "GO" command ("G"). One merely types "G" at the prompt, followed with the CPM group member: ":g00". The result is a peek at one sector of the directory:

```
00  00504950 20202020 20434F4D 0000003A  *.PIP      COM...:*
10  04050607 08090A0B 00000000 00000000  *....................*
20  00534554 4449534B 20434F4D 00000029  *.SETDISK  COM...)*
30  0C0D0E0F 10110000 00000000 00000000  *....................*
40  00535745 45502020 20434F4D 00000080  *.SWEEP    COM....*
50  12131415 16179596 9798999A 9B9C9D9E  *....................*
60  00464f52 4D415420 20434F4D 00000012  *.FORMAT   COM....*
70  C0C1C200 00000000 00000000 00000000  *@AB................*
```

Data sectors on other parts of the disk look the same, except that all the lines show ASCII data and formatting symbols. Each byte constitutes two digits on the line and its address is made up of the line number and its position on the line from 00 to 0F. For example, the byte representing the P in PIP.COM is the second byte on line 00 (containing the hex value of P or 50). The first byte address starts at 00; therefore, the address of the P is "01." The last byte on each line, accordingly, is made up of the first digit of the line number and its location on the line. The latter would be F. For example, the last digit in hex on line 60 above would be address 6F.

The first byte on the line tells the computer either to read or skip an entry in any ordinary operation. The hex 00 (or null) is correct for any active file in user area 0. If the file be erased, the first byte will be "E5." Any file can be unerased by changing the first byte to null "00," or can be changed to some other user area by chang-

Continued on page 154

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Getting In Deeper
Continued from page 153

ing it to the desired number. In addition, one can change group allocation numbers, so that accessing the file will read to the console any groups so designated; it is even possible to include groups not originally part of the file. This is a method for retrieving files with damaged directories.

It is possible to go directly to any part of the disk by Track and Sector rather than CPM groups. One types (at prompt) a "T" followed by track number, or "S" followed by a sector number. One can also move around by "+" to go forward one sector, or "-" backwards; and to jump many sectors one can use either sign followed by the number of sectors one wishes to jump. After each move, the location will be displayed. One dumps a sector by typing "D" at the prompt.

There is a splendid search utility. Typing the "=" at the prompt followed by a string of characters in ASCII or Hex causes DUU to search until found. Then it indicates the address of the string at the same time that it automatically moves to the correct sector.

To edit a sector, one types in "CH" followed by the address of the byte to be modified, followed by the desired characters separated by commas: "CH07,43,54,etc. <CR>" DUU will immediately show the characters displaced. If one is satisfied, the command "W" will write the revised sector to disk. It is possible to edit in ASCII by using the command "CA" instead of "CH" but one must be careful since machine code symbols which make the program operate cannot be represented in this way.

To put the program into automatic display mode, one can program a series of commands followed by the repeat sign ("/"). For example, to scan a disk sector by sector in ASCII and machine code (for example to look for lost data), type at the prompt the following: "v;10;+;/". Each symbol gives a command as follows: View the present sector, pause briefly go on to next sector, repeat until halted by C. To fill the screen each time, add a number (10 to 15) after the "V" to indicate how many sectors to be viewed at a time.

A very concise help file is appended at the end and can be accessed at any time by typing "?" at the prompt. We have only scratched the surface of this splendid utility and one is urged to explore the help for all of its potential applications. One can for example save a sector in buffer, move around and write it to any location. This is useful when a directory track has been damaged; the information can be moved to a free area of disk, the track can be reformatted, then the data moved back to the correct location for the directory—thereby saving the files.

By all means, every serious CP/M users should get his hands on DUU.COM. The budding hacker will find himself irresistibly drawn to experiment with this elegant and powerful piece of free software. Ward Christensen is to be saluted for this wonderful hacker's tool and also for his enlightened mode of distribution. ●

New Anti-Piracy Device

Voyager Development, Inc. announces the release of its Model SP101 Anti-Piracy device. The latest model in the Voyager SP100 Series is a low-cost hardware solution to the ever growing problem of Software Piracy. It has been estimated that software piracy will cost the software industry over $4 billion in sales in 1985.

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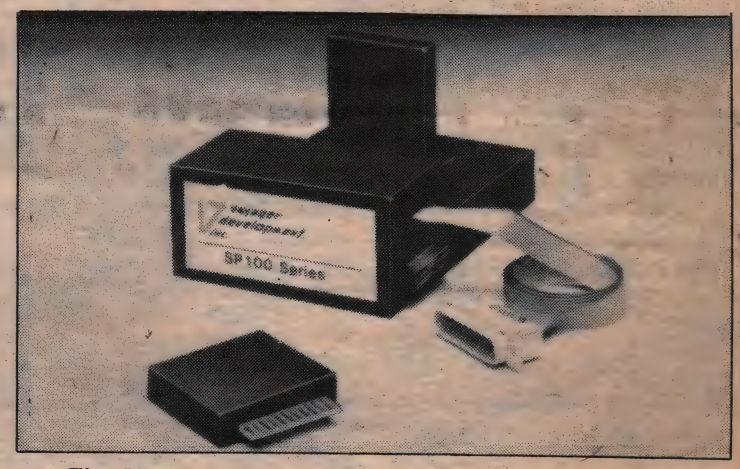

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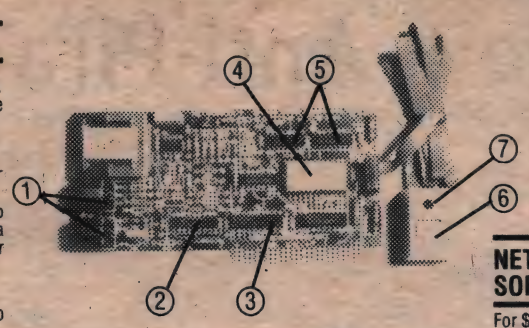

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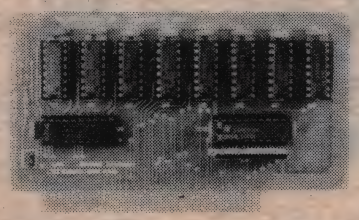

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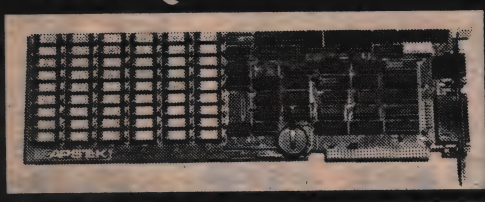

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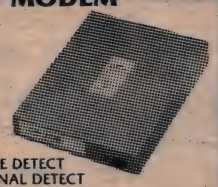

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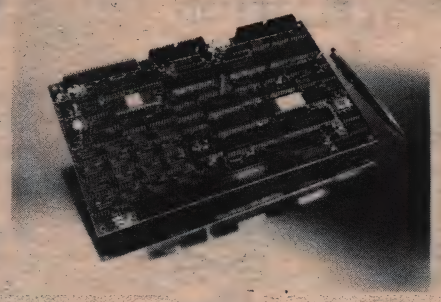

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Z80 CPU
MSC-ICO uses the most popular microprocessor, the Z80, as its main CPU. MSC-ICO runs at 4 MHZ without any wait states. The whole system is incorporated into a high quality four layer PC board measuring only 145mm X 250mm (10" x 6"). The system requires only 1.2 Amps at + 5 Volts and 0.1 Amps at ±12 Volts.

Banked CP/M Plus Included
CP/M Plus (3.0 banked) is included on disk with all manuals. CP/M Plus is upwardly compatible with CP/M 2.2 and includes the SID debugger, the MAC and RMAC macro assemblers and the LINK-80 loader. MSC-ICO's custom BIOS provides support for multiple disk formats and I/O device control. System specific software for disk formatting, disk copying, defining function keys and modifying screen attributes is also included.

128Kb RAM
One 64K bank of memory is devoted to CP/M and its disk cache blocks, while the other 64K bank is devoted to applications programs. This arrangement not only provides more memory for programs, but it significantly increases the speed of disk I/O.

Internal Floppy Disk Controller
MSC-ICO handles Shugart/ANSI standard floppy disk drives in a variety of sizes and formats:
- 8" SSSD, 243Kb
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- 5-1/4" DSDD, 320Kb
- 5-1/4" DSQD, 800Kb
- 5-1/4" QHD, 1.2Mb

Up to four drives of any density or size can be connected to MSC-ICO. Both 5 1/4 and 8 inch connectors are on-board to make disk drive connections easy.

High Speed CRT Controller
MSC-ICO contains an 80 x 24 line memory mapped CRT controller. Video output is composite or separate to match any monitor. Attributes such as insert and delete line, reverse video, and semigraphics are supported. Cursor escape sequences are an extension of DEC's VT52 and can be easily reprogrammed to emulate most standard terminals.

Two RS232C Ports
MSC-ICO communicates with printers, modems, plotters, and other standard RS232C devices through its two serial ports. These ports are independently programmable for baud rates, stop bits, data format and parity. Synchronous communication on Port A is jumper selectable.

Centronics Parallel Port
A standard Centronics parallel port allows MSC-ICO to communicate with printers and other parallel devices.

Parallel Keyboard Port
MSC-ICO connects to any ASCII parallel keyboard of positive or negative polarity with a negative strobe. A type-ahead buffer and programmable function keys are provided by MSC-ICO's custom BIOS.

16 Bit TTL I/O Port
This port allows you to access printers, relays, LED's, DAC's, ADC's, switches, EPROM programmers and many other devices.

Clock Calendar
The battery backed up clock calendar provides time and date information to CP/M for file stamping. The clock can also be accessed from applications programs.

External Bus
MSC-ICO's 50 pin bus connector provides expansion for a hard disk controller, RAM disk, graphics or a 68000 system. Please call or write for more information on these options.

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ROBOTICS

Designing And Building Mobile Power Systems For Robots

Part IV

by Bill Dodd

The design of a robot's power system is usually, one of the most neglected parts of a robot's design. Yet, as in the health of a human, the robot's health will be directly affected by what, how much, and how often it is fed (energy).

The power system for the robot must satisfy several constraints.

1. SUFFICIENT POWER must be available to perform the work required. This means on-board power must be sufficient to get the robot through its work cycle or task assignment. This may mean recharging once each task is accomplished, at the end of each "work day" (which may be the night time while people are away), or at the end of several work periods.

Though compressed air may be used as a power source, the recharging coupling requirements are more complicated than electrical power. To date, battery power has proven to be the simplest, least expensive, least bulky, and most reliable power source.

2. SAFETY: SAFE POWER must be available. This means proper fusing of power sources and protection of the battery from shorting or damage. A loose battery can damage robot parts or short out unexpectedly, so mounting is very important.

3. CONTROLS REQUIREMENTS: Since many computers and peripherals require several voltage levels for their operation, it is not uncommon to need either many batteries or to provide the higher voltages with an inverter type power supply. This is the most complex power supply problem in a robot, and often requires extensive design consideration. A quick solution is to provide 120VAC to the various systems supplies. Obtaining an inverter with a sinusoid output becomes important in some computers and accessories.

4. ELECTRICAL NOISE CONSTRAINTS: Electrical noise can play havoc with the control system in a robot. Many robot builders have built and tested each robot module successfully only to find the system would crash when finally bolted and connected together in the robot body. This problem is normally due to motor brush noise, and can also be eliminated by proper filtering of motor and power circuits. RF noise can also cause problems and the use of two way radios and RF modems must be handled carefully.

APPLICATIONS: RECOMMENDATIONS

In the case of the Bulldog Robot, 8-C (or D) cells are used as the power source. Since the circuitry is simple and localized, only one fuse is required to protect the wiring and batteries. In a more complicated robot, say a 5' tall computer operated robot with manipulators, you may wish to fuse instrumentation individually. If an inverter is being used, it should also be protected with fusing on both input and output sides!

BATTERY CARE:

Batteries must be properly cared for, or their life will be curtailed. In the case of dry cells, they should be kept cool and not discharged rapidly. In the case of rechargeable batteries, insure that they also are not discharged quickly or too deeply. Heed the manufacturers recharging and operating instructions.

Gell cells are a good power source for home robots they provide a large capacity and do not spill acid if tipped over.

Deep discharge batteries are the best power source for use outdoors because of their higher capacity and current ampacity. The extra power provides needed current for uneven terrain.

TYPE OF BATTERIES:

1. FUEL CELLS: (Hydrogen, Hydrazine & Methanol). These are similar to a battery except that one or both of the reactants are kept in external fuel tanks. These are not recommended until they are commonly found and prices are down.

2. PRIMARY BATTERIES: Like your common flash-light battery, these are not easily capable of being recharged: Types are - LeLanche, magnesium, Organic Cathode, Zinc Air, and Lithium Organic. these are not recommended except as control or isolated microcomputer backup batteries.

3. SECONDARY BATTERIES: These are readily capable of being recharged. The types (recommended for robotics use are asterisked) are as follows:

a. Lead Acid	37 Watt Hours/ Killogram* (Gell cells somewhat less)
b. Edison	29 W.H./Kgm
c. Nicad	33 W.H./Kgm*
d. Silver Zinc	100 W.H./Kgm
e. Silver Cadmium	55 W.H./Kgm
f. Zinc Nickel	55 W.H./Kgm
g. Zinc Air	110 W.H./Kgm
h. Cadmium Air	90 W.H./Kgm
i. Zinc 02	130 W.H./Kgm
j. H202	65 W.H./Kgm

Further significant improvements in these secondary cells as well as new revolutionary batteries are now under way, so keep your eyes open for new power sources to drive your robot.

4. RESERVE BATTERIES: Primary batteries with a key component held in reserve until the battery is needed. An example is a sonar bouy battery (in an air-dropped bouy) that is activated when sea water pours into the cell. These are not recommended for use in normal everyday robots.

COMPUTER OPERATION:

Computer operation from mobile power supplies (inverters and batteries) is not too difficult if the proper voltages are provided and maintained. However, as a robot's power supply drains, the voltage usually drops and the computer can get into a marginal state - where some of its parts are working and others are not. The monitor is usually first to experience problems and is usually noticeable by contracting or waving display. Circuits can start burning out on undervoltage, so include a low voltage detection circuit on your larger robot projects. Either shut down part or all of your computer or switch in a reserve battery to 'get the robot home' to its recharging station!

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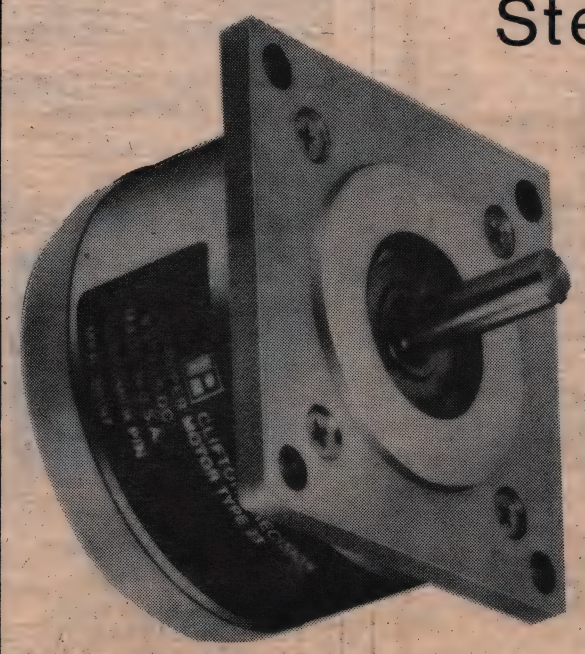

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Interphase Corp. Introduces Single-Board VMEbus Computer System

A new compact VMEbus-based microcomputer system has been announced by Interphase Corp. The single board computer, called the BASEboard, is built around two Motorola 68000-family microprocessors and is a foundation for value-added designers developing high-performance microcomputer systems.

The computer system includes an MC 68010 CPU with virtual memory and demand paging; up to 2M bytes of memory with memory management; an integrated disk controller for Winchester and floppy disk drives; both serial and parallel ports; five VMEbus expansion slots; and a UNIX™ operating system. The BASEboard is a complete multiuser/multitasking computer system.

The BASEboard's MC 68010 CPU runs at 10Mhz with virtual memory and demand paging. The system includes 512K bytes of zero wait state Dynamic Random Access Memory (DRAM), and is expandable on-board to 2M bytes. A discreetly implemented Memory Management Unit (MMU) allows 32 to 64 simultaneous contexts of up to 4096 pages, each 2K bytes long.

The MMU is an efficient "single level" design that alleviates the addressability problems of "segmented" chip designs without added wait states. It supports a variety of protection and status mechanisms. UNIX™ Version 5.2 and VERSABUG are options available.

The BASEboard disk controller section is based on a second microprocessor, an MC 68008. The integrated disk controller supports a mixture of three ST506, ESDI or ST412HP Winchester disk drives, as well as four 5¼-inch floppy diskette drives. The disk controller can perform Direct Memory Access (DMA) into on-board memory, or to an external memory card plugged into one of the VMEbus expansion slots. Completely programmed in firmware, the disk controller's operating system can also be modified or added to for additional disk or VMEbus functions.

The computer supports eight users with fully programmable serial ports, and can add up to 32 additional users with VMEbus serial cards. Each port can be independently programmed as to data rate, bit format, asynchronous, synchronous and bit or byte-level protocols - including SDLC/HDLC and SDLC-loop protocols.

The BASEboard has four individual interrupt vectors for each port which convey the information for transmit, receive, error condition and status change. Four-level FIFO buffers store data to powerfully and efficiently handle multiuser serial communications. All eight channels (plus five additional channels) can be run at 19.2K bits/second in asynchronous mode, with data rates of up to 1M bits/second supported.

Generic TTL interfaces, with full modem control, can be combined with optional adapter cards to support RS232, RS422, RS423, current loop and other interfaces. The computer can support a mix of terminals, printers, modems and other devices.

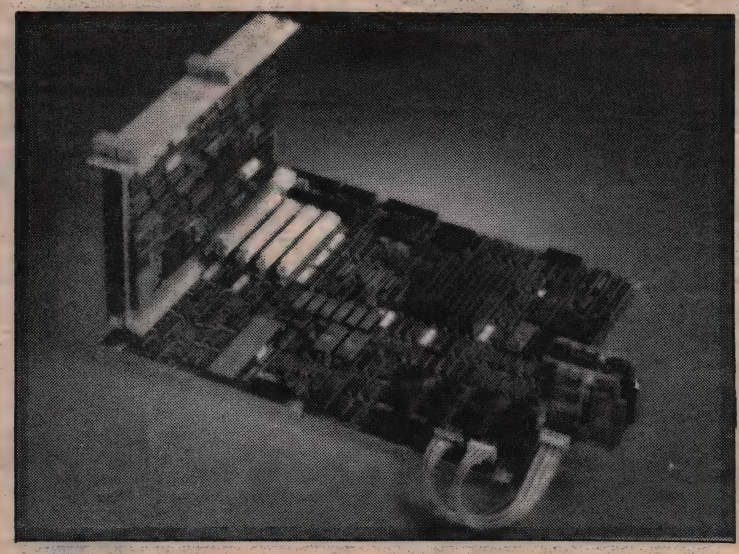
The CPU also has four programmable general purpose timers, each with a separate interrupt vector. A general-purpose 8-bit parallel port can be used for off-board power-fail sensing, remote switches, parallel printer ports or display functions.

The VMEbus BASEboard computer from Interphase sells for $5995 in single-piece quantities. Pricing is available for OEM quantities by contacting the company.

In addition to its new BASEboard VMEbus computer, Interphase Corporation has developed a broad range of high performance intelligent disk and network controllers for the VMEbus, Intel Multibus and IBM PC. The company's products are sold to OEMs and through computer retailers.

More information on the company and its products is available by contacting Interphase Corporation, 2925 Merrell Road, Dallas, Texas 75229.

Mention that you read about it in Computer Shopper. ●



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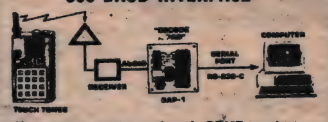

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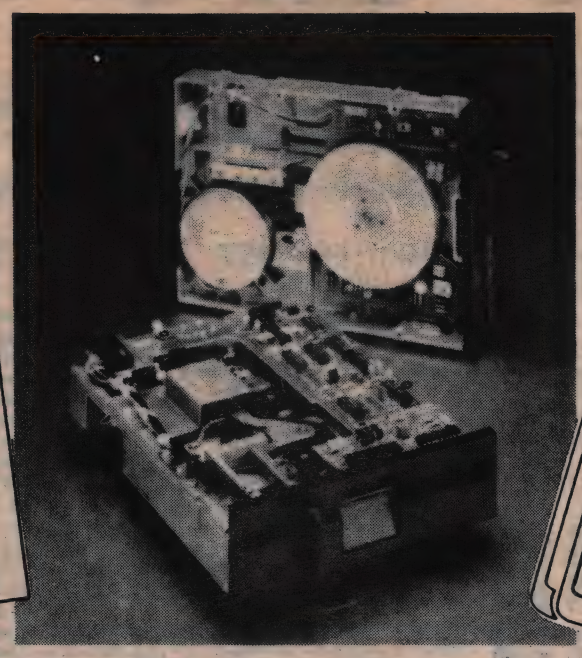

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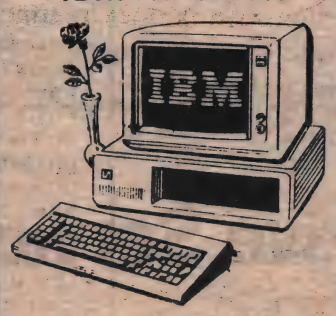
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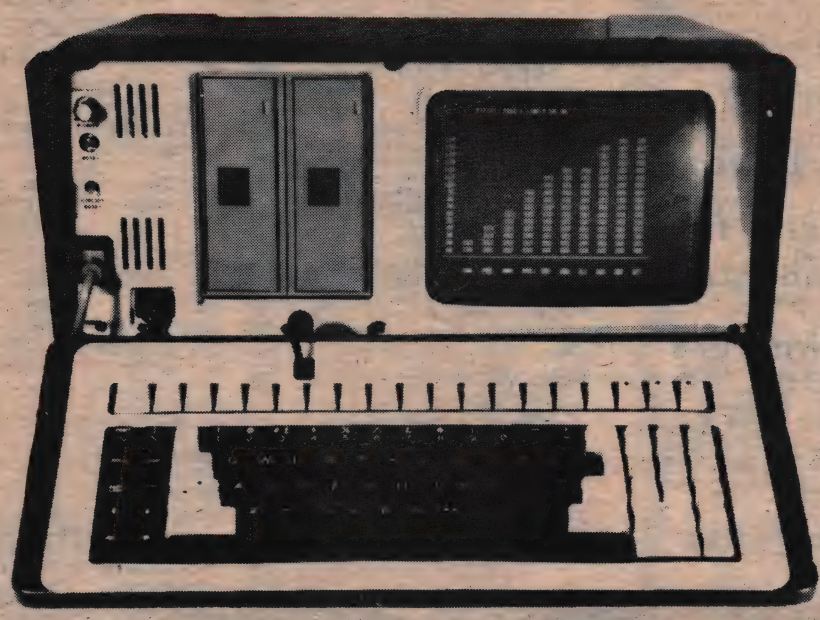

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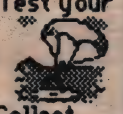

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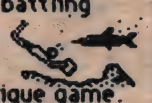

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To paraphrase Bogey, if you don't buy your Sanyo from Scottsdale Systems you'll regret it; maybe not today, maybe not tomorrow, but soon and for the rest of your life.

The Silver Fox™ Trots Through Lotus like 1,2,3

The Silver Fox has always run hundreds of programs originally written for the IBM-PC. Now with its new compatible video board and GW Basic it runs the most popular and powerful software in microcomputing, including Lotus 1,2,3, dBASE II, Multiplan, the PFS series, and even Flight Simulator. Yet you still get an incomparable combination of hardware and software at a price that invites comparison.

MORE HARDWARE

Each Silver Fox comes with an 8088 CPU, 256K of RAM, monochrome and color video, and a printer port all on a single board. Plus you get more than twice the storage of a standard PC, 1.6 Megabytes on dual 5 1/4" floppys, and the Fox will read and write to all popular PC formats.

Standard equipment also includes a better keyboard, and a 12" high-resolution, green monochrome monitor, with a full 25x80 column display. And although the Silver Fox doesn't have "compatible" expansion slots you can add serial ports, modems, plotters, printers, joysticks, and 8087 co-processor, and/or a hard disk.

Because the Silver Fox is born on a totally automated line in Japan it is simply more reliable than PC's that are assembled by hand. So we back each Silver Fox with a one year limited warranty, four times the industry standard.

FREE SILVERWARE

Were this not enough, each Fox comes with the best free software bundle in the business including:

MS-DOS 2.11	Sketch	Spell
Color BASIC	15 Games	Mailit
GW BASIC	WordStar	FILEBASE
HAGEN-DOS	CalcStar	PC File III
Qwikdisc	Easy Writer	PD Disk
Datemate		

If you didn't think your

$1397

could buy you this much computer, give us a call and we'll rush you a brochure that will tell you how it can.

ColorFox $1688

Ask about our open access package

Columbia's

If you're looking for maximum compatibility, minimum prices, nationwide service, you should consider buying a Columbia from Scottsdale Systems. Each system comes with MS-DOS 2.1, Basica 2.0, Perfect Writer, Calc, Speller, Filer, Fcst Graphs, Home Accountant Plus, Space Commanders, ATI Tutorials, and T.I.M. IV data base manager. We have the best prices on all Columbias including the new 1600-1V Plus or VP Plus with 256K, keyboard, and video card for:

$1899

Closeout Sanyo1100's

Sanyo MBC 1100 computers with two built-in 360k drives, 12" green phospher monitor, 80 column/25 line display, plus over $2000 of the best-selling Micropro software including WordStar, CalcStar, MailMerge, SpellStar, ReportStar, DataStar; CP/M and BASIC. Not a souped up Commodore or a portable with unknown software - but a powerful combination of hardware and software for business use, while they last.

$848

TERMINALS

Ampex 210
w/14 emulations $434
Wyse 50 ..... $499

Also great prices on other Ampex and Wyse terminals, as well as ADDS Televideo, Qume, and Zenith.

PLOTTERS

HI DMP-29 ..... $1795
HI DMP-40 ..... $745
HI DMP-41 ..... $2340

MODEMS

Password $308
Prometheus $339

Compatible Drives Teac Slimline

FD54A (160K) $69
FD55B (360K) $139
FD55F (720K) $159

Altos Systems ... big discounts, local installation

Scottsdale Systems Ltd.

617 N. Scottsdale Road, Suite B, Scottsdale, Arizona 85257

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SINCE 1980

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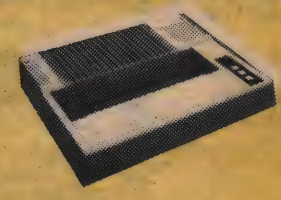
PRINTERS



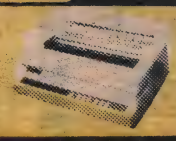
EpsonFX-80 .. ~~$360~~ $180 off
Tally Spirit 80 ..... $254
Okidata 92 ~~$195~~ .. $125 off
Okidata 93 ~~$395~~ .. $210 off
Okidata 84 ..... Call
Dataproducts
8050 "loaded" $1344
Tally 160L $589
Panasonic 1091 ..... $298
Toshiba 1351 ..... $1269

LETTER QUALITY

Juki 6100 ..... $398
Juki 6300 ..... $767
Silver Reed 400 ..... $249
Silver Reed 500 ..... $299
Silver Reed 550 ..... $409
Silver Reed 770 ..... $724
NEC's ..... Call
Daisywriter 2000 ..... $824

DIABLO LQ SALE

Diablo 630 API $1499
Diablo 620 $715



STAR MICRONICS SALE

Gemini 10X $244
Power Type $299
Radix 15 $589

SOFTWARE SHOPPING LIST

NAME: Mass Mailer DOS: IBM PCDOS or MSDOS
TYPE: Mailing list program
COMPUTER: IBM PC and compatibles
DESCRIPTION: This program generates labels, envelopes, and mailing lists in nearly every format and size, including Chesire. The system is totally menu-driven.
PUBLISHER: Alternative Software, Inc., 1165 Barbara Drive, Cherry Hill, New Jersey 08003 (609)429-3838
COST: $199.95

NAME: District Ledger DOS: TRSDOS
TYPE: Accounting program
COMPUTER: TRS-80 Dual Disk Model III, or 4 in Model III mode with 132 column printer
DESCRIPTION: Maintains 3 files on 2 diskettes. There is no need to switch disks except when making a backup or copy of the Account file. Can perform a variety of functions.
PUBLISHER: Gleason Sackmann, RR 3, Box 2-J, Bottineau, ND 58318
COST: $700

NAME: ForteGraph DOS: MSDOS
TYPE: Graphics package
COMPUTER: IBM PC, XT, AT
DESCRIPTION: This is a combination software and board package which allows a computer to act as a full function IBM color graphics terminal, linked to an IBM mainframe. It provides enhanced emulation of an IBM 3279 model S3G color graphics terminal with programmed symbols.
PUBLISHER: Forte Data Systems, 2205 Fortune Drive, San Jose, Ca 95131 (408)945-9111
COST: $1,595

NAME: The Real Estate Brokerage Office System
TYPE: Real Estate Software package
COMPUTER: TI Professional Computer
DESCRIPTION: This software package is designed for automating files used in real estate office, such as office maintenance, sales information and report generation. A key feature of the software is its ability to forecast future company dollars. This organizes the distribution of funds for existing accounts and allows brokers to call up these accounts in various ways: by the client's name, or by the client's address.
PUBLISHER: Texas Instruments Inc., Data Systems Group, P.O. Box 809063, Dallas, TX 75380-9063 (800)527-3500
COST: $1,725

NAME: Sales Planning and Sales Reporting and Productivity DOS: MSDOS
TYPE: Management software for sales and marketing managers
COMPUTER: IBM PC and compatibles
DESCRIPTION: These two programs allow a sales or marketing manager to produce a complete sales organization chart as well as sales plans, staffing plans, quota plans, revenue plans and product plans for almost any company. It can track actual performance against plans, produce analyses, summaries and charts for quota performance, product performance, profitability, revenues and sales expenses.
PUBLISHER: Mastersoft, Inc., 4628 North 17th Street, Phoenix, AZ 85016, (602) 277-0900.
COST: Sales Planning: $450; Sales Reporting And Productivity: $395. Both products can be purchased together for $695.

NAME: Lightyear DOS: PC-DOS
TYPE: Management program
COMPUTER: IBM PC
DESCRIPTION: Program guides a person through the decision-making process in a manner that makes it easier to organize, analyze, evaluate and communicate all the factors important to a decision. It lets users define decisions in terms of alternatives, criteria and rules. Multiple versions of a model can be made and then compared.
PUBLISHER: Lightyear, Inc., 1333 Lawrence Expressway, Bldg. 2, Santa Clara, CA 95051
COST: $495

NAME: Resume Bank I DOS: PC-DOS or MSDOS Version 2.XX
TYPE: Employment agency program
COMPUTER: IBM PC
DESCRIPTION: Resume Bank I maintains resume profiles consisting of applicant name, telephone number, skills, etc. You define these codes representing applicant skills. When you have a requirement to meet, simply search through these codes to find the qualified applicants. Once you've found qualified applicants, Resume Bank I allows you to produce mailing labels for these applicants.
PUBLISHER: System Vision Corporation, 199 California Drive, Suite 207, Millbrae, CA 94030

NAME: PCPLOT DOS: PC-DOS
TYPE: A high resolution graphics program
COMPUTER: IBM PC and compatibles and the VICTOR 9000
DESCRIPTION: This is a general purpose high resolution graphing program which makes pixel resolution screen and printer graphs for scientific and financial purposes. PCPLOT creates linear, semi-logarithmic and full logarithmic plots in any combination of the x-axis and two y-axes. Up to four plots can be made on the same graph with optional legends.
PUBLISHER: BV Engineering, 2200 Business Way #207, Riverside, CA 92501
COST: $62.95

NAME: Economy Pharmacy Software DOS: CP/M, CP/M-86, MS-DOS
TYPE: utility program for pharmacies doing fewer than 75 prescriptions per day.
DESCRIPTION: This program is scaled to the needs of small or rural pharmacies serving up to 7 third party plans and dispensing an average of under 75 prescriptions per day. The system produces labels, receipts, profiles, daily and narcotic reports and is designed to run quickly in menu-format on hard disk systems and can still be up-graded to the Universal System at a later time.
PUBLISHER: Software Development, Corp., 270 Amity Road, Woodbridge, Connecticut 06525 (203) 397-0500
COST: $2,500

NAME: INTEGRATED 7
TYPE: integrated software program
COMPUTER: IBM PC
DESCRIPTION: INTEGRATED 7 has the following seven components: Relational data base management system; a spreadsheet; datamail; word processor; business graphics; communications; terminal emulation;
PUBLISHER: Mosaic Software, Inc., 1972 Massachusetts Ave., Cambridge, MA 02140 (617) 491-2434

NAME: Star Search DOS: Apple DOS
TYPE: Educational game
COMPUTER: Apple II, 48K
DESCRIPTION: Players learn about various planets and have the opportunity to look for alien life forms. If found, these life forms are designed to be "possible" given the environments in which they are supposed to live. Each game is designed to be different. The alien life forms are elusive and if found cannot be expected to wait for your return to be "found" again. Players may also save games for later re-entry.
PUBLISHER: Earthware Computer Services, P.O. BOX 30039, Eugene, OR 97403.
COST: $45 with dealer/distributor discounts

NAME: Profit Optimizer DOS: Apple DOS
TYPE: stocks and commodities software
COMPUTER: Apple II
DESCRIPTION: This program is a profit optimization program used to optimize a trading strategy in the stocks and commodities market. It will also automatically vary the values of the following types of stops, to determine your most profitable stop strategy: Trailing Stps, From Entry Stops, Take Profit Stops, From Entry/Take Profit Stops.
PUBLISHER: Microvest, P.O. Box 272, Macomb, IL 61455 (309) 837-4512
COST: Complete Profit Optimizer package retails for $395.

NAME: Compubridge
TYPE: instructional
COMPUTER: Apple II, Commodore 64, 48K Atari
DESCRIPTION: Compubridge has 10 chapters of text and 8 corresponding quiz sections. The computer will randomly generate an unlimited number of practice hands corresponding to the different chapters. As you play, Compubridge will evaluate your actions, correcting mistakes or weak moves by suggesting alternative strategies.
PUBLISHER: Artworx Software Company, Inc., 150 North Main Street, Fairport, NY 14450
COST: $24.95

NAME: Nevada COBOL DOS: CP/M operating system
TYPE: management program
DESCRIPTION: Nevada COBOL has the following features: Random access and sequential files; debugging capability, copy statement, character string, 16-bit binary and packed decimal data types. Nevada COBOL generates 8080 machine language so run-time is fast.

Software Shopping List
Continued From Page 165

PUBLISHER: Ellis Computing, Inc., 3917 Noriega Street, San Francisco, Ca 94122 (415) 753-0186
COST: $39.95

NAME: Weather Pro
TYPE: weather forecasting program
COMPUTER: Apple II+, IIe, IIc, TRS80 Model I, III & 4, Trs80 COLOR, Commodore 64

DESCRIPTION: Weather Pro provides accurate area-specific forecast for current day, next day and following day. Forecast provides high and low temperatures as well as precipitation. Also gives deviance from the norm. Attractive printout for future reference.

PUBLISHER: Petrocci Freelance Associates, 7301 East 22nd Street, Suite 14E, Tucson, AZ 85710 (602) 296-1041.
COST: $29.95

NAME: Science of Learning Series DOS: Apple DOS
TYPE: Educational
COMPUTER: Apple II
DESCRIPTION: This four-volume (total of 9 disks) program is designed to teach beginning reading to children of about first grade age. Entitled "Learning to Read: Letters, Words, and Sentences," the program utilizes the Echo II speech synthesizer, since it is necessary that the teacher of beginning reading be able to talk to the child.
PUBLISHER: Learning Horizons, 7590 El Cajon Blvd., Ste. E, La Mesa, CA 92041
COST: Each 2-disk volume retails for $39.95, and the Echo lists at $129.95

NAME: RM/COBOL Version 2 DOS: PC and MSDOS
TYPE: utility
COMPUTER: IBM PC AT
DESCRIPTION: The enhancements of Version 2 of RM/COBOL are designed to improve performance and file handling while maintaining source and object code compatibility. Specific enhancements include index file integrity improvements; index file system restructured to increase performance; handling of Duplicate Keys changed to increase performance; all files can now be locked when they are opened, and much more.
PUBLISHER: Ryan-McFarland Corporation, 609 Deep Valley Drive, Rolling Hills Estates, CA 90274 (213) 541-4828.
COST: $950

NAME: Just Your Type
TYPE: Instructional
COMPUTER: Apple II+, Apple IIe, Commodore PET, Commodore 64, IBM PC, XT, and jr.
DESCRIPTION: Just Your Type is a guide to touch-typing on a computer. The computer guides you slowly from the first lesson through to the "game" that test skills and increases speed. The complete set of programs combine to form a comprehensive package of educational software which is certain to improve the typing skills of anyone, regardless of age or previous typing experience.
PUBLISHER: Right On Programs, 140 East Main Street, Huntington, NY 11743
COST: $50

NAME: GNOSIS VII DOS: 3.3
TYPE: Educational
COMPUTER: Apple II+, IIe, IIc, III and Apple compatibles
DESCRIPTION: GNOSIS VII is a learning and mind development program. All-powerful, unseen forces govern this fantasy realm. Life's operating laws and patterns must be discovered through an intensive process of logical deduction.
PUBLISHER: Magnetic Harvest
COST: $24.95

NAME: Address/Dialer DOS: Apple DOS
TYPE: personal management program
COMPUTER: Apple II+/IIe, with 48K and Novation Apple-Cat II, Hayes modems, or compatibles. IBM PC version available soon
DESCRIPTION: Address/Dialer provides easy, quick access to all names, addresses, phone numbers, appointments, birthdays, and memos. It automatically dials any person you select, any long distance services can be easily programmed into the system. Access number and pass codes need be entered only once into the program.
PUBLISHER: Christopher Systems Corporation, 2775 Glendower Avenue, Los Angeles, CA 90027 (213) 664-4880.
COST: $79.95

NAME: MODEM80 Version 4.0 COMMUNICATIONS PACKAGE
TYPE: communications software
COMPUTER: TRS80 Model I and III
DESCRIPTION: MODEM80 is a disk oriented system designed to be used as a general purpose terminal program, but its main function allows file transfer with a wide variety of other computers or terminals. All programs are written in assembly code. All MODEM80 versions feature remote operation ability, error free file transfers, and file transfers with many other types of computers with the TRS80 acting as a terminal. Files of unlimited length may be handled, files may be prepared off-line, transmit and receive files may be opened before communication begins, and may be turned on and off independently.
PUBLISHER: The Alternate Choice, 9505 W. Brown Deer Rd., Milwaukee, WI 53224 (414) 355-4544.
COST: $79.95

NAME: AMORT*ZIT
TYPE: utility
COMPUTER: IBM PC and IBM compatible, TRS 80 Model II, III, Model 12 and New Model 2000

DESCRIPTION: This program was written specifically for law offices, accountants, banking and financial offices and mortgage co., and computer co. that wish to produce standard hard copy amortization tables on their own computers.

PUBLISHER: COMPUTX (Software for Micros), 14 Pierce Ave., Oak Ridge, NJ 07438, (201) 697-3141.
COST: $85

NAME: AUTO TEST AUTHORING
TYPE: educational
COMPUTER: DEC Rainbow 100

DESCRIPTION: Auto Test Authoring is a test creation package which allows teachers to author original drill programs. Featuring 4 different test formats, grading and security options, the package includes both Master and Work diskettes and complete documentation.
PUBLISHER: Resource Software International, Inc., 330 New Brunswick Avenue, Fords, New Jersey 08863 (201) 738-8500.
COST: $89.95

NAME: MICA Accounting Series DOS: PC DOS 3.0
TYPE: accounting software for small-medium size businesses
COMPUTER: IBM PC AT and XT
DESCRIPTION: The MICA series comprises General Ledger, Accounts Payable, Accounts Receivable, Payroll, Inventory Control, Sales Invoicing and Job Cost.
PUBLISHER: Micro Associates, Inc., 2349 Memorial Blvd., Port Arthur, Texas 77640 (409)983-2051.
COST: Suggested retail prices for the MICA programs range from $495 to $995 each.

NAME: MS-DOS FULL SCREEN COLOR DOS: MS-DOS (users with PC-DOS 2.0 can also run the MS-DOS version)
TYPE: Utility
COMPUTER: IBM, Wang, DEC
DESCRIPTION: The CRT control codes for several terminal types and color patterns are stored in a disk file. A utility program is provided that allows the user to select a color pattern or terminal type from a menu. Three color patterns are provided, which may be installed with a single keystroke. Other utilities are provided that allow customization of the color patterns.
PUBLISHER: Earth Data Corporation, P.O. Box 13168, Richmond, VA 23225 (804) 231-0300.
COST: $395

NAME: The Art of Negotiating
TYPE: Thought processing program
COMPUTER: IBM XT, IBM PC, PCjr, IBM clones, and the Apple III
DESCRIPTION: The Art of Negotiating is a tool that a negotiator can use to think through any type of negotiation he/she may encounter. The program is divided into nine sections or modules which take the user through the steps of an actual negotiation which the user specifies at the outset of the program. The software is user friendly. The user supplies his own answer disk and types in "NEG" and the program takes over from there, directing and guiding him with screen prompts.
PUBLISHER: Experience in Software, Inc., 2039 Shattuck Ave., Suite 401, Berkeley, CA 94704 (415) 644-0694.
COST: $495 (comes with a 15-day money-back guarantee)

NAME: HS/FORTH DOS: PCDOS or MSDOS
TYPE: interpreter program
COMPUTER: IBM PC and MS-DOS machines
DESCRIPTION: HS/FORTH provides interactive program development superior to BASIC, compact code, machine and peripheral control, and syntax resembling human language at a program's higher level. HS/FORTH includes utility files to read, write and load standard MS-DOS files, standard screens, and screens mapped onto random access files. Other utilities include segment management, graphics, software and 8087 floating point, string functions, program editor, and music. The music utility demonstrates a background multitasking example.
PUBLISHER: Harvard Softworks, P.O. Box 2579, Springfield, OH 45501 (513) 390-2087.
COST: $250

CLASSIFIED

CLASSIFIED INFORMATION

CLASSIFIED AD RATES

The classifieds are for **Pre-Owned Items & Software ONLY.** New equipment, Services, etc. must use regular Display space.

Instructions

In order for us to keep the ad rate low and insure accuracy, it is necessary that the following procedures are followed.

1. Type or print your ad legibly on a plain sheet of paper. Ads received that are difficult to read will be returned.
2. **Write the desired category at the top of each ad. Please refer to the index, this page. If a category is not indicated, ad will be placed in the Miscellaneous section.**
3. If more than one ad is submitted, use a separate piece of paper for each ad, making sure your complete name and address is at the bottom of each ad.

CLOSING DATE — 2nd Monday of the month. Example: the closing date for June's Issue is the 2nd Monday of April. **Due to our low rates, you cannot change, cancel or receive a refund on classifieds after they are typeset.** In most cases, ads are typeset within a week after they are received.

RATES — Subscribers: 17 cents per word. $3.00 per ad minimum charge. The first two words (if underlined) will be set in bold face at no additional charge. Bold face or all cap words thereafter will be thirty-four (34) cents per word. Special bold headings, partial lines, open space or leader dots are:

8 point line, $1.22 cents per line.
10 point line, $1.73 per line.

Maximum of 15 characters per line.

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REPEAT ADS

Ads running more than one time. A repeat ad will be coded at the end of the ad with the month ad started and issue ad ends. Example: 8-160. Ad started Aug. ends 160 issue or January. NOTE: Please check to make sure your ad has been correctly coded.

PROOFS

Due to low classified rates a free checking copy or tear sheet cannot be sent if proof of insertion is desired, please send $3.00 extra.

PHOTOS

A photo will draw attention to your ad. Photos are $7.00 per column inch. Please send in B/W photos, preferable 4x5's cropped horizontally. Include your name and address on the back of each photo. If photo looks like it is more than one inch send in money for two inches or more.

★ $5.00

★ ★ $4.00

★ ★ ★ $3.00

STARS

Have a special piece of equipment to sell? Reducing the price of an item and want to attract attention to that fact? Take advantage of our low price "star" attention getters.

It's a fact...unusual "artwork" in or above an ad draws attention that ad and the reader retains interest in that product longer.

GET RESPONSE QUICKER with "Stars" above your ad. Below is the rate for different sizes. Just mark "stars" and the price of the one you choose above your ad copy and we'll take care of the rest. Be sure to include the cost with your ad payment.

CS-ABBREVIATIONS

add-post .....add postage
add-post-AP ...add postage, all prices
FC .....Freight Collect
MBG .....money back guarantee
PP .....postage paid
SASE .....send self-addressed .....stamped envelope for .....check return or .....information requested
10 DRP .....10 day return privilege
CCR .....check clearance required

EXAMPLE OF STYLES:

Normal

PDP 11/03 COMPUTER. Complete operating system with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000, or separate at: 11/03 Computer $900. Dual RX-1 disk $1,000. 32KB memory $2,800. VT-52 video $1,500. GE Terminet 30 printer $800. Intertube video terminal $400. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

10 Point Centered Head

PDP 11/03 COMPUTER

Complete **OPERATING SYSTEM** with RT-11 system software plus basic. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

Individual Listings

PDP 11/03 COMPUTER

Complete **OPERATING SYSTEM** with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000, or separate at:

11/03 Computer $900
Dual RZ-1 disc $1,000
32KB memory $2,800
Intertube video terminal $400

John Doe, POB 1234, Somewhere, USA 00000. 123-456-7890.

(101) TRS-80 COMPUTERS FOR SALE

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Copyright laws pertaining to software can be enforced. Due to the complexity of determining what software is legal or illegal, any and all liability for copyright violations shall rest solely upon the advertiser. Patch Publishing and its staff do not in any way condone or knowingly participate in any such illegal activity.

2000 AT A STEAL!! Tandy 2000 System for sale - 256K Hi-Res Color - Save $1500 with 90 day warranty. **Godfather's Used Computer Syndicate,** P.O. Box 3037, 1154 W. SR 436, Forest City, FL 32714. 305-774-1111 1-61

ÇANADA Model I 48K, two drives, keypad lower case Visicalc, Scripsit, $C900 plus shipping. **519-524-7274. Ontario.** 1-61

FREE SOFTWARE - Color computer home word processor suitable for tape or disk, 16K required. Enclose $2 fee for handling, duplication and postage. **Paul Geyer,** Carteret Mobile Park F-1, Carteret, NJ 07008.

LOBO MAX-80 DELUXE SYSTEM for sale. Includes Max-80 w/128k RAM, twin Shugart DSDD 5" drives (1.4 megs storage!), Amdek 300A green monitor. This is the best 8-bit Z-80B system money can buy! Software includes LDOS 5.1.4, CP/M 2.2, Microsoft Basic, Microsoft Basic Compiler, Wordstar, Disc Doctor. Everything in excellent condition. Entire package $1995 or best offer or will split. Call **Murphy** at 212-929-5821. 1-61

MODEL 100 32K WP/SS software. Cassette unit, modem and printer I/F. **Almost new** (original pkg.) **$900** plus shipping. **Bruce Wilson,** 27 Whispering Pines, Birdsboro, PA 19508. 1-62

MODEL 4, 64K, 2 disk drives. Like new. $1000. **201-444-2850.**

MODEL FOUR, 128K. LetterQuality Printer. $1500. **203-777-1476.**

MODEL I 16K w/lowercase. Includes Exatron stringy floppy and 18 wafers; cassette software including Tiny Pascal, Editor Assembler, Scripsit, games and more - over 20 programs; screen/manuals. Excellent condition $325. **Tom Wright,** 602 Lee Ct., Waukesha, WI 53186. Evenings 414-542-0009.

MODEL I, . $48k, EI, 2 Lobo Drives, keypad, lowercase, gold plugs, manuals, diskettes, $575. Model III, 48k, 2 drives, 232C, $675, manuals. **Mike,** 205-693-3770 days; 205-983-4972 nights. POB 245, Headland, Alabama 36345. 2-62

MODEL SIXTEEN Two drives, software $2500. **203-777-1476.**

★ ★ ★

RADIO SHACK DT-1 Data Terminal cat. #26-6050, 6 months old, mint condition, with manual, originally $699, asking $400. Two drive disk expansion bay cat. #26-4161 mint condition, asking $400. Radio Shack Modem II cat. #26-1173 fully programmable auto dial/ans with manual. Needs $20 repair, originally $249, asking $75. **Scott,** 718-439-8164.

TANDY 2000 used only three months. 128k. Excellent condition. All manuals including compatible monitor and cable. $2300/BO. **Frank Quinn,** 27 Castle Circle, Peabody, MA 01960. 1-61

TRS-80 BASKETBALL for models I/III/IV. Pick NBA players, teams, seasons. Statistically accurate. For info: 52 Pine Avenue, Randolph, Mass. 02368.

TRS-80 MODEL II, like new, Okidata printer, includes all software, all for $2500. Call **Bill Brown** for info: 800-238-5542 12-61

TRS-80 Model 3 - 48K with speed up board and 4 double density drives includes cables. With software and some manuals including DosPlus 3.4, DosPlus 4.0, MultiDos 1.6, NewDos 2.1, TrsDos 1.3 - Operating Systems, Scripsit & Copyart II - Word Processing, TRS-80 Profile Data Base, Maxi Manager B.O 4-drive Data Base, Dome Bookkeeping, TRS-80 General Ledger, TRS-80 Payroll, TRS-80 Accounts Payable, TRS-80 Accounts Receivable, Enhanced Visi-Calc. PRICE IS NEGOTIABLE!!! Call **Phil** at 203-937-0106. 1-62

TRS MODEL I or III business package used in our day to day mail order operation. Package includes 10 programs, similar systems selling for thousands. We wrote it, and use. $29.95 on single or double density data diskette. **Andy H. Weaver Company,** West Farmington, Ohio 44491. 216-548-8799. 2-66

CLASSIFIED ORDER FORM

Classified Dept., COMPUTER SHOPPER
P.O. Box F, Titusville, FL 32781

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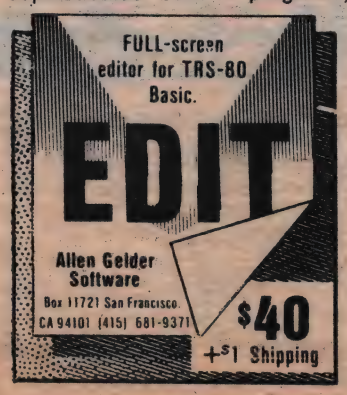

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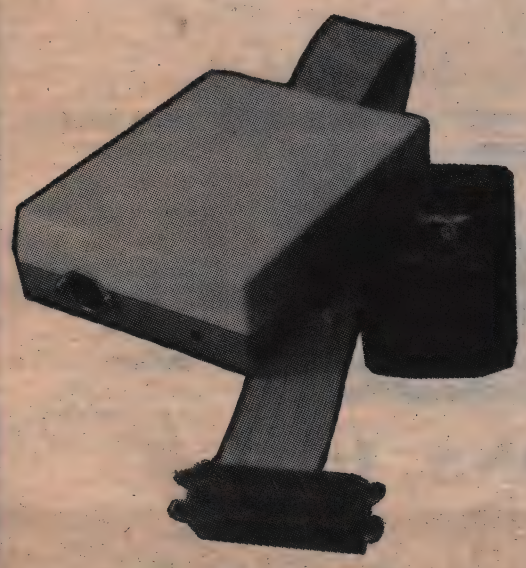

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LAST CALL!! Atarians! Figure Eight Auto Racing. Maximum graphics sound and action! Now $10 disk. Unlike any other game! 48K. **RASCOM,** 22128 Newkirk Avenue, Carson, CA 90745. 1-65

MACHINE LANGUAGE made EASY. With AMAC or MAC/65. EASY allows machine language programming using BASIClike statements. Includes over 60 macros. $39.95. $2 shipping. 301-236-4459. **SUPERware,** 2028 Kingshouse Rd., Silver Spring, MD 20904. 11-62

SCRAMBLER - The name says it all. Your Atari program written in BASIC can be scrambled so no person can read or change your program. Available on disk for $7. You can receive our catalog of Game and Utility Programs by sending $1 (refundable with order). **RWR Enterprises,** 3703 Rust Road, Annandale, VA 22003. 7-75

SUPER SOFTWARE SALE! For a limited time only purchase ATARI software at savings up to 75% off the retail price. Write or call for price list specifying the SUPER SOFTWARE SALE. **SOFTWARE NETWORK INC.,** 16W655 Mockingbird Ln. Suite 108, Hinsdale, IL 60521. 312-323-3868. 2-62

USED SOFTWARE for sale, including manuals. Over 50 different programs priced from $4.95 to $21.95. Send for list. **Gary Hagood,** Box 2, Junction City, KS 66441.

(111) HOMEBREW SYSTEMS

(112) NORTHSTAR COMPUTERS

BUYING NORTHSTAR computers and peripherals for cash. Call 619-438-7828 for an offer. **Craftsman,** Box 6500, Carlsbad, CA 92008.7-63

NORTHSTAR ADVANTAGE 1-drive as is $820. **Dave,** 1428 29th Street NE, Cedar Rapids, IA 52402. 319-363-1298.

NORTHSTAR HORIZON 5-users, 2/HSIO-4 boards, 1-DSDD drive, 352 X-RAM without hardisk; TSS/C HDOS CP/M HBASIC; excellent condition. Asking $2900. **401-849-8112.** 2-63

NORTHSTAR HORIZON 1 double-sided drive (360K), 1 single-sided (180K), 56K RAM, 2 serial/2 parallel ports; EPSON MX80F/T printer friction-feed, graftrax, 2K serial buffer; SWTPC CT-82 terminal, CP/M 2.2, VEDIT, MT-Pascal, COBOL, Z80 macro assembler, PILOT, MuMath. $1475. Add-post. **919-848-9734** (evenings). 1-61

NORTH STAR Horizon II 64K DD with xtras. Soroc IQ-120 terminal with options. Teleprinter DMP Mod. 4320AAC Pin Feed. Cables, 11 manuals, 90 disks. Cannot ship. $1600 net CCR. Call 813-466-6134 or write **William Paulus,** 55 Kiowa Drive, Fort Myers Beach, FL 33931.

(113) COMMODORE COMPUTERS FOR SALE

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25 VIC-20 PROGRAMS ON CASSETTE $5.95. 20 COMMODORE 64 PROGRAMS ON DISK OR CASETTE $5.95. FOR FREE INFO WRITE: SOFTWARE, 234 87TH PLACE SOUTH, BIRMINGHAM, AL 35206. 205-836-3395. 12-61

COMMODORE 2 COMPUTER SUPER HARDWARE/SOFTWARE PACKAGE: Package includes 2 computers, the **Commodore B-128** (80 col., 128K RAM) and the **PET 2001/N** (32K, BASIC 4.0 upgrade); + **8050 Dual Disk Drive** (1 Megabyte Total) + Gorilla 12" green **monitor** + 2022 **printer** (150 c.p.s.) + 2 cassette drives + ADA 1450 serial printer adapter + triple flip (installed in PET); Software includes **Superscript II** (with spelling checker) + **Superbase** for the B-128, + **Wordpro 3+** and **Jinsam** 4.0 and **Flexfile** 2.1 and **Papermate** and **Basic Aid** and **Adventure** and other software packages for the PET. Bonus - I will throw in a VIC 20 and **VIC Modem. Price $3000** (original cost about $6000. Contact **Gary Greenberg,** 212-321-2364.

PENNIES a program for your Commodore computer. SASE for list. State model. **Knockout Software,** P.O. Box 360, Pomona, NY 10970. 2-62

Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

JANUARY 1985

JANUARY 16-18, 1985
UNIX, a three-day seminar that will include a detailed review of "C," will take place in Stamford, CT at the Hotel Stamford Plaza. For more information, call 404-359-1619

JANUARY 21-25, 1985
UniForum will be held in Dallas, Texas in the INFORMART. 200 major vendors in 850 display booths are expected. Also, there will be 14 all-day tutorials, 44 conference sessions and free UNIX introductory workshops. For more information, call 213-592-1381.

JANUARY 28-31, 1985
Communication Networks Conference & Exposition takes place in the Washington Convention Center in Washington D.C.

JANUARY 29-31, 1985
INTRODUCTION TO DATA COMMUNICATIONS course offered by the Department of Continuing Education, Georgia Institute of Technology. This course covers data communications technology, terminology, hardware, software and services. For more information, contact Elaine Hadden Nicholas, Department of Continuing Education, Georgia Institute of Technology, Atlanta, Georgia 30332-0385 (404)894-2547

JANUARY 31-FEBRUARY 2, 1985
SEROMDA '85 Convention and Exposition will be held at the Opryland Hotel in Nashville, Tennessee. For more information, write to Larry Long, Sanford Business Machines, Inc., P.O. Box 1142, Sanford, North Carolina 27330 or call 919-775-5419

FEBRUARY 1985

FEBRUARY 2-3, 1985
SOFTEACH seminar conducted by Softsel Computer Products, Inc. will take place in San Francisco, CA at the Sheraton Palace Hotel. For additional dates and places, contact Softsel News Bureau, 160 Newport Center Drive, Suite 210, Newport Beach, CA 92660 (714)640-7375

FEBRUARY 4-6, 1985
OAC '85 to be held at the Georgia World Congress Center in Atlanta. The 1985 Conference "Today's Partnership: People & Technology" will stress state-of-the-art office solutions and the need to increase human and systems integration for increased productivity. For information, contact Helen Mugnier, AFIPS, 1899 Preston White Drive, Reston, VA 22091 or call 703-620-8926

FEBRUARY 6-8, 1985
NETWORKING PERSONAL COMPUTERS, a three-day workshop, will take place in Jacksonville, FL at the Sheraton Hotel at St. Johns Place, 1515 Prudential Drive, Jacksonville, FL 32207. For additional dates and places, write DATA-TECH INSTITUTE, Lakeview Plaza, P.O. Box 2429, Clifton, NJ 07015

FEBRUARY 6-7, 1985
THE CINCINNATI BUSINESS AND COMPUTER SHOW will be held in the Cincinnati Convention Center. It will feature hardware, software, peripherals, telecommunications, turnkey systems, office furnishings, and seminars. Admission $3. For details and complete schedule of events, contact Class Productions, Inc., 4207 N. Clinton St., Ft. Wayne, IN 46805 (219)482-3448.

FEBRUARY 7-10, 1985
THE 1985 WESTERN COMPUTER AND BUSINESS EXPO will be held at the San Diego Convention and Performing Arts Center. The Expo will feature a combination of over 100 seminars, workshops, and exhibitors. For more information, contact Western Expos, Inc., 7119 E. Shea Blvd., Suite 106-277, Scottsdale, AZ 85254.

FEBRUARY 8-10, 1985
2nd Annual Stride Faire '85 will be held at the MGM Grand Hotel/Casino in Reno, Nevada. The major focus of the show will be high-performance microcomputer software and systems. For more information, contact Laura Smith, Trade Show Manager 702-322-6868

FEBRUARY 10-13, 1985
INFOMART will host a seminar titled "Personal Computers: Now in Business" at the Dallas Market Center complex in Dallas, TX. For more information, contact Marlan D. Stredwick at 214-655-6298

FEBRUARY 15-17, 1985
RAINBOWfest will be held in Irvine Marriott in Irvine, CA.

FEBRUARY 20-22, 1985
INFO/CENTRAL: The Information Management Exposition & Conference will take place at the O'Hare Exposition Center in Chicago, IL. For more information, contact INFO/CENTRAL 999 Summer St., Stamford, CT 06905 (203)964-8287

FEBRUARY 21-23, 1985
MACWORLD EXPO will be held in Brooks Hall in San Francisco, CA. Call 617-329-7466 for more information.

FEBRUARY 22-23, 1985
IEEE Computer Faire will be hosted by the Institute of Electrical and Electronic Engineers. The event will take place in the Exhibition Hall of the Von Braun Civic Center in Huntsville, AL. The hours are 10am-7pm on Friday and 9am-5pm on Saturday. For more information, contact Terry Mizell at 205-532-2036

MARCH 1985

MARCH 2-3, 1985
COMPUTER SUPERMARKET will be held at the San Mateo County Fairgrounds in San Mateo, CA. Contact Microshows, P.O. Box 4323, Foster City, CA 94404 (415) 571-8041 for more information.

MARCH 3-8, 1985
The Annual Convention and Technology Exposition will be held at the Albert Thomas Convention Center in Houston, Texas. Hosted by The American Institute for Design and Drafting, the convention marks its 25th and the technology exposition its 10th. The theme will be "Soaring To New Heights." For more information, write to AIDD National Headquarters, 901 N. Washington Street, Suite 509, Alexandria, VA 22314

MARCH 11-14, 1985
The Computer Science Conference will be held in the Marriott Hotel in New Orleans, LA. The conference is sponsored by the Association for Computing Machinery and the Computer Science Departments of many universities. For more information, write to Computer Science Employment Register, Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, PA 15234.

MARCH 14-16, 1985
PERSONAL COMPUTER INTERFACING WORKSHOP will be held in Blacksburg, VA at Virginia Tech. This is a hands-on workshops with each participant wiring and testing interfaces. For more information, call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061 (703)961-4848.

MARCH 15-17, 1985
1ST ANNUAL PHILADELPHIA COMPUTER SHOW to be held in the Philadelphia Civic Center. For more information, call CompuShows 301-263-8044.

MARCH 19-20, 1985
CHARLOTTE HAMFEST AND COMPUTER FAIR will be held in the Charlotte Civic Center. Call Mecklenberg Amateur Radio Society 803-366-7157 for more information.

MARCH 22-24, 1985
THIRD ANNUAL MARYLAND COMPUTER SHOW will be held in the Baltimore Civic Center. For more information, call CompuShows 1-800-368-2066.

MARCH 30-APRIL 2, 1985
THE 10TH WEST COAST COMPUTER FAIRE will be held at the Moscone Center in San Francisco, CA. 350 companies will be exhibiting in 1,000 booths. Price of admission includes comprehensive Conference Programs. For more information, contact Computer Faire, Inc., 181 Wells Avenue, Newton, MA 02159 (617)965-8350.

MARCH 31, 1985
THE 1985 GREATER BALTIMORE HAMBOREE AND COMPUTERFEST will be held at the Maryland State Fairgrounds Exhibition Complex at Timonium, Maryland. This is the largest multi-interest personal computer, small business computer, electronics show, and flea market in the Mid-Atlantic area. A large exhibit area will display and sell the latest computers and software as well as the latest in electronics. Guest speakers will present a wide range of interesting topics throughout the day. Admission is $4, children under 12 are free. For additional information, contact G B H & C, P.O. BOX 95, Timonium, Maryland 21093-0095 (301)561-1282.

MARCH 15-17, 1985
ORLANDO HAMCATION to be held at the Orland Expo Center. For more information, contact 305-295-2929.

SUPERPET 9000, 8050 disk drive, 8023P printer, six languages, books, mint condition, sacrifice $2400 CCR. Write: **Ken Tuominen,** R#1 1526 Co. Rd. CP, Champion, Michigan 49814. 1-61

(113A) COMMODORE COMPUTERS WANTED

SCHOOL HAS 8032 - Wants 4016 or 4032. **203-485-1631**

WANTED: COMMODORE 64 computers. $75 for those in working condition. Please call **205-221-5211.**

WILL BUY Commodore 64, equipment software and hardware. Cash paid. Good working equipment only. Call. Or write: Box 292, Midwood, Brooklyn, NY 11230. 12-64

(113B) COMMODORE SOFTWARE, PERIPH.

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We are so sure you will love our IEA Instant Editor/Assembler for your Commodore 64, we'll give you 30 days to try it out. Don't spend fifty or sixty dollars and then get stuck with a slow, hard to use assembler with no money back guarantee! IEA assembles to 17k of source code in 4 seconds directly to memory. IEA files are also compatible with Commodores Assembler. Just learning? That's great. Starting with the FEB-MAR issue of Commodore magazine, I will be writing a machine language column using the IEA for all source code listings. Try assembly language programming. It's easier than you might think. And now you can try it with absolutely NO RISK! Order with VISA/MASTERCARD or send a check for $19.95 plus $2 handling to: **Robin's Software,** Box 20220 Dept CS, Bloomington, MN 55420. 612-944-8654. 1-61

1100 PUBLIC Domain C64 Programs. Educational, Business, Games, Utilities, etc. 20 programs of your choice for $8.95. Send $4 for a double sided postpaid demonstration disk and catalog. **Eric Richardson,** 6230 Lark Valley Dr., San Antonio, TX 78242. 2-63

$19.95 for both! AUTORUN-64: Now your programs can load and run automatically, just like the commercial ones do: LODA"*",8,1. AUTORUN-64 writes a MC load program on your disk. Amazing! **DIR-LABEL-64** prints the disk directory on a self adhesive label. See the directory at a glance. Includes 100 tractor feed labels. Disk $19.95! SASE/info. **C-Tech,** Box 38553 #178, Houston, TX 77238.

ADULT ADVENTURE "Naughty Bytes" for C-64. Too risque to describe here. Only $20 postpaid. Specify disc or tape. **FTW Products,** 154 S. Hedges St., Dayton, OH 45403. 10-62

ADVENTURE PACK. Three text adventures on disk for Commodore 64. "Old Hotel", "Imprisoned", "Hospitabomb". Hours of fun. All three just $13.95 PPD. **D&B,** PO Box 2154, Columbus, Mississippi 39704.

ADVENTURE— The original adventure game, now available for the Commodore 64. Try becoming a wizard; few people ever do! (Disk only.) Send check or MO for $15 to **Funware,** P.O. Box 70, Woodsville, NH 03785. 12-61

AUTODIAL/REDIAL "front end" for your basic or ML terminal program. Menu selection of phone numbers (with comments) or manual entry. Redials until connected. When connected automatically loads and runs your terminal program. Disk/Instructions $15.00 PP. Certified check or money order. **D.A. Neilson,** 86 Inwood Ave., Poughkeepsie, NY 12601.

BBS SOFTWARE for Commodore 64. This software turns your Commodore into an electronic BBS system that can be accessed by any type of computer. Requires one 1541 disk drive and Commodore 1650 Automodem or Westridge Automodem. Features include: Message Base, Chat, Upload & Download, Private Sysop Messages, etc. Includes Sysop program to read, write, append, print or review messages and files offline. "64 BBS Express" on disk. Special limited time offer $16 PPD. **D&B,** PO Box 2154, Columbus, Mississippi 39704. Dealer inquiries invited.

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C64 DISK MAGAZINE! Latest programming techniques! Exciting games! Informative tutorials! Incredible software discounts! Time & money saving tips! Recruiting bonus program! Much, much, more! Published monthly. Only $36/yr. Sample $6. **Micro Connection,** Box 457-CS, Lakeview, MI 48850. 2-64

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C-64 GAMES CHEAP! Send stamped envelope for list of games available and you will also receive a disk utility program listing free along with details on how to make money at home with your C-64. Business, home management, utility and educational programs are also available at low cost. Send to: **C-64,** Box 64A, Pompano Beach, FL 33074. 1-63

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CHECK-MATE, AN ELECTRONIC CHECKBOOK program for your Commodore-64 with one disk drive. Menu driven program lets you keep all checkbook transactions on floppys, list transactions on screen or printer, search for checks by number, date, payee, or memo, and balance it all with computer ease! Many other features, all for the incredible price of $15.99! Send check or money order to: **Big Apple Software,** 91 Strawberry Hill, Suite 1140, Stamford, CT 06902. 1-61

COMMODORE-64/GRAPHETI A sophisticated and flexible high resolution graphics editor. Draw portraits, landscapes, abstracts, and game layouts. Program diskette and manual only $29.95 (MA add 5% tax). Send check or MO to **Aries Software,** P.O. Box 3006, Andover, MA 01810. 1-62

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COMMODORE 64 OWNERS: Why buy unwanted software? Look before you leap! Rent it first. **Previeware!** P.O. Box 970, Bronson, FL 32621-0970. 10-61

COMMODORE 64 Programs — Full disk — Amateur radio, morse code practice, etc. $8 or two diskettes of your exchange programs. **NEOF,** Box 955, Joplin, MO 64802-0955. Wanted: C-64, 1541 Drive, Color monitor, HAMTEXT, Kantronics 11 Interface.

COMMODORE 64 and **VIC-20** regular and personalized programs at the lowest prices. Many to choose from, priced as low as $3.00. Free catalog! **Britton Software,** 8703 S.E. Jardin St., Hobe Sound, FL 33455. 2-66

COMMODORE EXCITEMENT: Business, Education, Entertainment. C64, Super Text by Muse $99 Now $75 disk, Step By Step by PDI $59.95 Now $45 disk. Vic, Portfolio Manager $29.95 Now $24 tape and disk, Astro Patrol $19.95 Now $15 tape. Lists Free: **Selective Marketing,** Box 1603 Dept. CS1, Longwood, FL 32750. 12-63

COMMODORE SOFTWARE! WARLOCK'S CASTLE - text adventure for VIC with 8K+ Expander. Tape $8.95, disk $9.95. VIDEO POKER - for single player, unexpanded VIC. Tape $6.95, disk $7.95. C64 version POKER 64+ - up to four players. Disk only, $8.95. Add $1 postage per order. Write for FREE CATALOG. **Reilly Associates,** Box 17144-CS, Rochester, NY 14617. 1-61

COMPUTER-AIDED stock market decisions. It's time you put your computer to work for you. Receive stock market advice and stock selection and buy/sell decisions on C64 diskette. Send $29.95 to **S.M. Decisions,** Box 362, Dublin, PA 18917. 12-63

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DISK EASE— A new disk utility for your Commodore 64. Copies almost any software, unscratch scratched files, dos functions and copies files. You also receive a manual and other great functions. Three minute backup. Why pay $49.95 for a good disk utility, pay $9.95 for a great one. Send $9.95 plus $1 for shipping and handling to: **PG SOFT,** Post Office Box 31206, St. Louis, Missouri 63131. Also, we have a **SOFTWARE PROTECTION** manual. This manual explains how to protect your software. Send $19.95 to **PG SOFT** for your copy. 12-61

FREE Commodore-64 compatible/ VIC-20/ TI99-4A/ TRS80-CoCo/ Timex/ TRS80-100/ TRS80-MC10 programs! Send Stamps! **EZRAEZRA,** Box 5222-PCJA, San Diego, CA 92105.

FREE PAMPHLET! "Using The 1541 Disk Drive." Complete guide and handy reference sheet. **TL's Guide,** 3812 N. Northwood, Peoria, IL 61614. 12-64

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LASER MANIA: Software, interfaces, video discs. WOW! SASE Cyk-0, Box 454, Sharon Springs, NY 13459 or tel. 518-284-2460. 12-62

LOTTERY STATISTICS C-64 DISK. Keep track of your lotto numbers. Check your tickets for winners - Number trends - Pick new daily - 4 digit - lotto numbers - MORE. Send $16.95 plus $2 shipping and handling to: **ESP/Eastern Software Products,** P.O. Box 171, Otego, NY 13825. Now available for NY and PA, others soon. SPECIFY. 1-63

MACHINE LANGUAGE made EASY. With Commodore Macro Assembler, EASY allows machine language programming using BASIClike statements. Includes over 60 macros. $39.95. $2 shipping. 301-236-4459. **SUPERware,** 2028 Kingshouse Rd., Silver Spring, MD 20904. 11-62

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MAKE BANNERS, signs, posters with your C64 and printer. Letters, numbers and punctuations in six sizes. Prinze lets you print as you type, print on two lines or even save messages to disk for printing later. Specify printer and send $18 for disk to: **Prinze,** Rt. #1 Box 263, Selmer, TN 38375. 1-61

MULTIPLAN, $50. General Ledger/ Info Designs, $45. 64 Forth/HES Ware, $30. Story Machine/Spinnaker, $10. **Ted Wood,** 3538 Walker, Memphis, TN 38111. 901-454-1465 9-5 M-F.

NOTICE— Join the software club. No minimum requirements. A disc of assorted programs, Newsletter with free classified ad section, Discount Buying Service, Access to our BBS with several diversified subboards including an Adult section. You receive this monthly. Send $9.95 monthly (you join as little or often as you like). Please include an SASE, also for full details send an SASE. Call our BBS at 201-962-4956. **NARWID ELE,** 61 Bellot Road, Ringwood, NJ 07456. 1-61

REWARD

Commodore 64 owners: LET your computer pay its own way! It does the work; you bank the checks. Send SASE to: **Publishing Information,** Dept. CS, 1613 Chelsea Rd. #167, San Marino, CA 91108. 1-65

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SMALL BUSINESS ACCOUNTING - ACZ General Ledger - An advanced and easy to use double entry accounting system for your C-64. Prints monthly and year to date financial statements. Keeps record of transactions. 150 accounts and 1000 entries per month. $49.95 complete. **DEMO DISK $5** (applies to purchase). SASE/info. **C-Tech,** Box 38553 #178, Houston, TX 77238.

SOFTWARE SPECIALS! We carry a full line of software for the Commodore 64. All at **substantial discounts.** We feature **monthly specials** too! Call or write for free price list. **Bytes & Pieces,** P.O. Box 525, Dept. 30, E. Setauket, NY 11733. 516-751-2535; Source TCP637, Compuserve 72135,1710. 10-62

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THREE FREE C-64 astrology programs. You'll love them! Send tape or disk plus return postage or $5. **Virgo,** Box 429, Delhi, CA 95315-0429. 12-61

TWENTY $ Gets You Ten Of The Best Programs. Word Processing, Mailing List Data base, Machine Language Utilities, Games, Lottery, National Commodore 64/20 library. Send $20 - Specify (disc - tape): **PGA,** P.O. Box 2632, New York, NY 10009.

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(Oricle-DB, LOGO) (Zaxon, MS/Pacman) (Donkykong, Digdug) (Chopleift, QBoper) (Centerpede, Congobong) $20 each pair--Get'm all $65. They won't last. Send immediately: **PGA,** P.O. Box 2632, New York, NY 10009. CALL 212-420-0953. 11-63

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VIC-20 OWNERS

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WANTED 1541 Commodore Disk Drives. $75 for those in working condition. Please call **205-221-5211.**

WORDSWORD C64 80 column screen oriented word processor. The best at a super price, $23.95. **C. Cassano,** 1822 Higdon Ave., Mountain View, CA 94041. 11-61

WORDSWORD $$$ Save $$$. 80 Column full featured screen oriented word processor for the Commodore 64. Truely affordable and perfect for students. Amazing value $11.95. How can you lose??? Specify tape or disk. **Advancing Futures,** 1822 Higdon Ave., Suite 2, Mountain View, CA 94041. 2-62

(114) NORTHSTAR SOFTWARE PERIPH.

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for $39.95 plus $3 shipping. For more information or to order, please write: **DSE,** P.O. Box 40174, Albuquerque, NM 87196. 1-61

FOR SALE Sealed unregistered copy of Northword 3.1.4H hard disk version $59 pp. Also weight and balance program with graphic output for Piper Cherokee Aircraft. Northstar Advantage only. $20 or SASE for information. **Randy Staponski,** 3003 South Joplin Place, Tulsa, OK 74114. 918-832-7933.1-61

NORTHSTAR HORIZON Computer System, 64K, 2 disk drives (double-density, double-sided), HSIO-4 board (gives you extra RS-232 ports. Can be up-graded to a multiuser system. Televideo 925 terminal with green phosphorus screen and programmable function keys. Software is 5¼" disk version, runs under Northstar DOS (or hard disk version available) and CP/M software 5¼" disk version. Package: $3500. **201-444-2850.**

(115) IBM PERSONAL COMPUTERS FOR SALE

BELOW WHOLESALE CORONA Desktop, w/128K RAM, 320K Drives, Monitor, Corona DOS, GW Basic, PC Tutor, Multimate. $1600. Includes UPS Shipping. **305-979-2622.** 2-64

COLUMBIA 12MEG Hardisk mint DOS2.0 color monitor, Lotus 1-2-3, Multimate. $3200. **203-777-1476.**

COLUMBIA MPC-1600-4, 10 MB hard disk, floppy, 384K RAM, Amdek amber monitor, MS-DOS 2.11, lots of software (write/call for list), new condition $3140 plus UPS. **Ron,** Box 227, Greenwood, MO 64034. 816--537-7927 or 816-758-6236. 2-63

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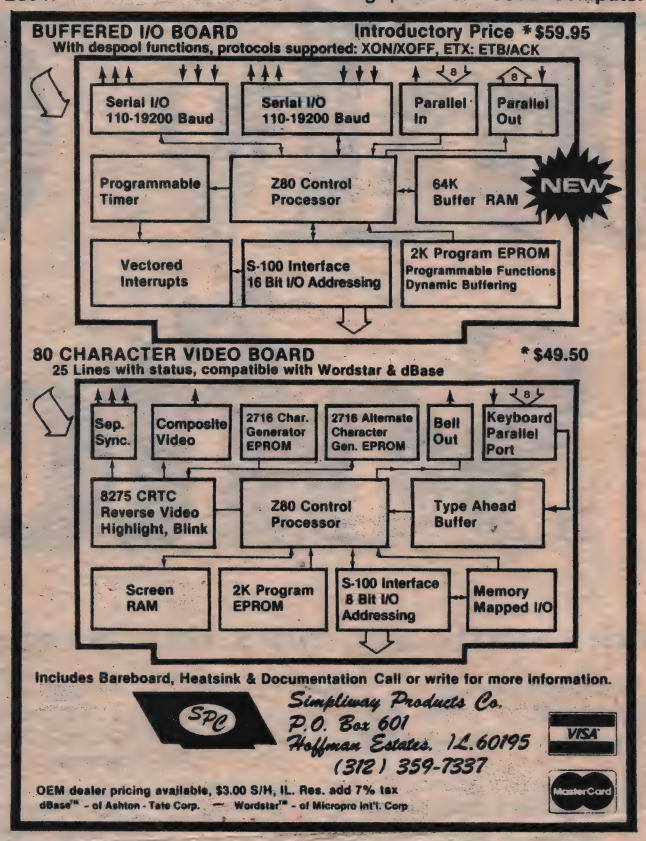

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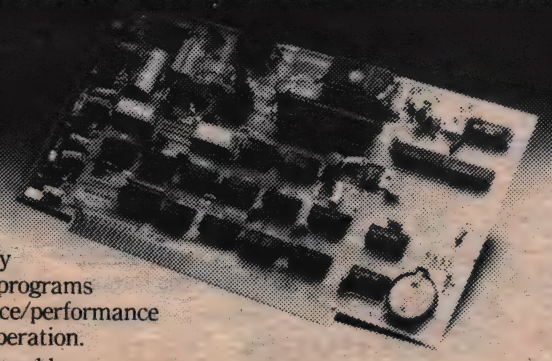

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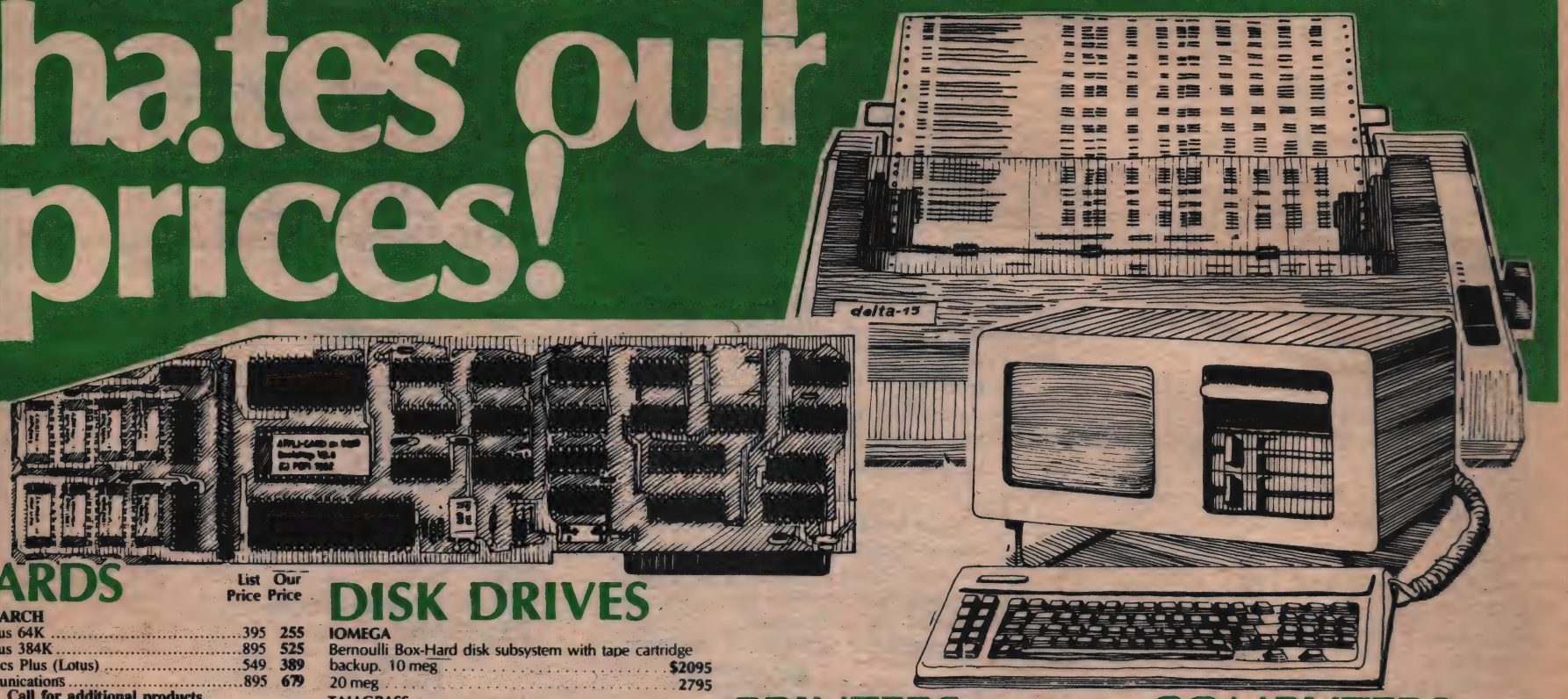

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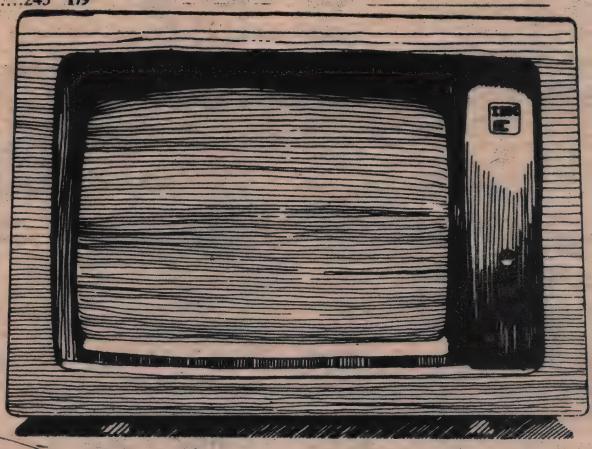

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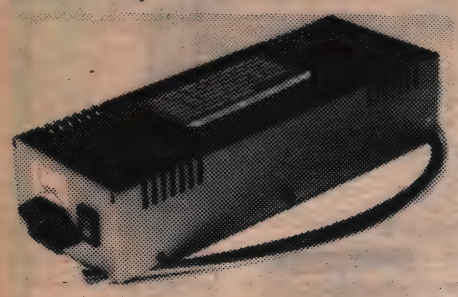

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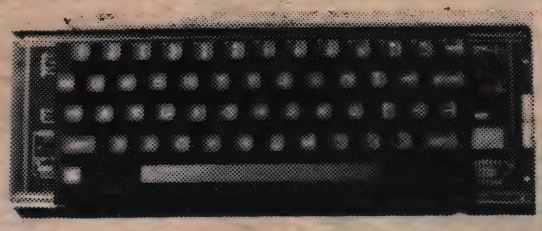

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Floppy Control Card by Sigma Designs, Inc. (IBM-PC Compatible) $110
Qubie 300-1200 Baud Modem for IBM-PC $279

PC Upgrade Specials!

10 Megabyte Winchester for $795

130W POWER SUPPLY
XT COMPATIBLE
UPGRADE YOUR PC
INSTRUCTIONS INCLUDED
+5V - 15A
+12V - 4.2A
-5V - .5A
-12V - .5A
$159.95

90 Days Labor
ONE YEAR WARRANTY (Parts)

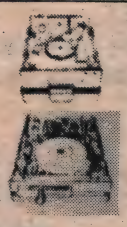
DISK DRIVES

FULL HEIGHT

TANDON TM	100-2 $159 DS/DD
CDC	$169 DS/DD

HALF HEIGHT

TEAC	FD-55B $145 DS/DD
PANASONIC	JA551-2N $135 DS/DD



5¼" Floppy Diskettes Storage

$15.50

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& Compatible Products
Build Your Own PC —
Compatible at Economical Prices!
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DSDD Disk Drive — $135
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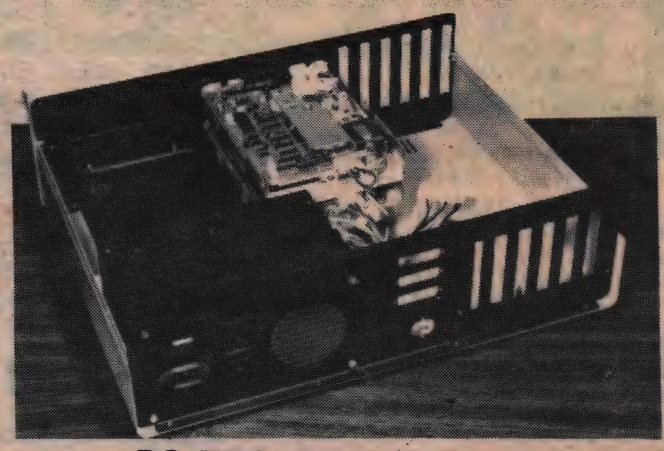

PC ENCLOSURE — $99
PC POWER SUPPLY (100 Watts) — $109

- A sheet metal enclosure designed for our PC-88 card (Equivalent to Mother board)
- With a power supply and fan
- Enclosure will house four half height drives
- Complete wiring harness and power cord

PC KEYBOARD — $125
DELUXE Capacitance Type Keyboard — $169

PC-88 CPU-Card — $375

- 4.7 MHZ 8088-CPU, Supports the 8087 Math Coprocessor
- Full IBM Bus Compatible
- Two 2764 EPROM Sockets for system firmware. A boot PROM for PC DOS
- One input DIP switch; speaker and Keyboard interface.
- 8253-Timers, 8259 interrupt controller, and 8237-DMA controller

PC COLOR/GRAPHIC CARD — $189

- Plug compatible with IBM Color/Graphic Display Adapter
- Alphanumerical Mode - Low resolution 40 col. x 25 rows, high resolution 80 col. x 25 rows
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IBM-PC Parallel Port to Centronics Cable — $19

For Santa Clara areas Please call: (408) 727-0906. Also for 4000 Series CMOS Parts

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ALL Prime IC's 100% Guaranteed!

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Shipping charged on all orders. Minimum order: $15.00. Please call on all orders as items are limited to quantities on hand. Prices subject to change without notice. *NO OPEN ACCOUNTS / NO FOREIGN ORDERS, PLEASE!*

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Power One G5-35/OVP, 5V@35A, OVP preset @6.2V, 17"x5", 18 lbs.	$70.00
ACDC OEM 5N17-1, 5V@17A, 10"x5"x5", 14lbs.	$45.00
Power Components C-611, 5V@10A, 13"x3"x4½, 9 lbs.	$25.00
Trygon LBS6-24-OV, 4.8-6.8V@24A, 6"x17"x8", 36 lbs.	$60.00
Tokin ST0510-S2, +5V@10A switcher 8½"x4¾"x1¾", 2 lbs.	$30.00
Sanyo 5V@6A Switcher 7½"x4"x1¾", 1 lb.	$25.00
Lambda LXS-CC-5-OV, 5@16A, 5"x5"x9.25", 15 lbs.	$45.00
Lambda LXS-D-5-OV, 5V@27.5A 7½"x7½x9¼", 22 lbs.	$60.00
Sorenson SSD5-30, 5V@30A swticher, 5¼"x3½"x10¼", 6 lbs.	$75.00
Sorenson SSD9-50, 9V@50A swticher, 7½"x5½"x12¼", 13 lbs.	$175.00
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Dacom 2489-01-C, 12.5V@1A unregulated 5"x5"x3", 2 lbs.	$10.00
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CEA CEA6A20V252, 20V@2.5A, 5"x5"x7¼", 11 lbs.	$25.00
Sorenson SLC20-5, 20V@5A, 5¼"x3½"x8½", 4 lbs.	$40.00
Sorenson SSD24-8.5, 24V@8.5A 5¼"x3½"x10", 5 lbs.	$90.00
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Atalla CP 338, +5V@2A, OVP @6.2V, +12V@.3A, OVP@15V, −12V@.15A, 8"x3½"x4½", 4 lbs.	$18.00
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Power One CP323-A, 5V@2A, 12V@4A, 7"x5"x3", 5 lbs.	$50.00
Astec AA11261, 5V@6A 28V@1A, unregulated switcher, 7½"x4½"x2"	$50.00
Compower 70040 +5V@3A, +12V@5A, −12V@.1A, 5"x10¼"x2"	$50.00
Osborne Power Supply	$25.00

L.E.D.'s:

	Red	Green	Amber
T1¾	753R	753G	753A
T1	723R	723G	N/A
	10/1.50	100/10.00	1,000/60.00

DISC DRIVES:

- Tandon TM 502 12 megabyte unformated $325.

SURPLUS Tandon TM 55-2, 5¼", double sided, 48TPI 40 track, 6 msec. track to track* $124.

SURPLUS Tandon TM 100-2, 5¼", full height, 48TPI, 40 track, 6 msec., double sided* $139.

SURPLUS Tandon TM 100-4, 5¼", double sided, 96TPI, 80 track, 3 msec. $149.

SHUGART 604-S 5 Megabyte unformatted $149.

NEW Remex ⅔ height with full height face plate, 48TPI, 40 track, double sided. May be used in place of TM 100-2* $99.

NEW Shugart SA455 / Panasonic JA551/2N 5¼", half height, 48TPI, 40 track, 6 msec., double sided.* $139.

NEW Shugart SA465 5¼", half height, 96TPI, 80 track, 3 msec., double sided $225.

NEW TEAC FD55B half height, 48TPI, 40 track, 6 msec., double sided. Power: +12V @ .25A typ., +5V @ .38A typ.* $139.

NEW TEAC FD55F, half height, 96TPI, 80 track, double sided $169.

* All drives with asterisk are compatible with the IBM PC™ as 360K or 380K drives. Half height drives may required mounting brackets or filler plates not supplied with the drive.

All drives carry a 90-day guarantee.

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Qubex QA2000 $3,000.00

INTERFACE - Interfaces Supported
Model A-1, ST506 Compatible
Model A-2, SA1000, Q2000 Compatible

Max Cylinder: 1024, Max Head: 8, Max Sector Track: 256, Bytes/Sector/128/256/512, Max Data Rate: 5 Mbits/Sec., Data Encoding: MFM, Step Rate: 10 secs to 7.5 ms.

ADDITIONAL FEATURES - Built-in Data Separator w/Programmable Marginalization, Programmable Write Precompensation, 512 Byte Sector Buffer, CRC Generation/Verification, Stand Alone Format Capability, Detective Sector Deallocation, Media Defect Scan.

DIP SWITCHES:

9 Position Dip Switches 10/$5.00

MULTIBUS CARDS:

AIM 8mhz 68000 CPU's $400

ISBC 254 512 K Bubble Memory Card *ONE ONLY* $600

MONITOR:

5" green phospher for Osborne 1 $40.00

SINGLE BOARD COMPUTER:

Televideo 806, Six User, Z-80A based. Boards are assembled with all TTL parts and conectors in place. There are sockets on board for one Z-80A CPU, four Z-80A SIO, two Z-80A CTC's, one 2532, eight 4164's one 1793, one 2143 and one 1691, however we do not include these chips. AS IS: **$25.00** WORKING: **$75.00**

806 User Manuals	$10.00
Cobol Manual	$10.00
Telesync User's Manual	$10.00
TS816140 User's Manual	$10.00
TS800A User's Manual	$10.00
800 Boards AS IS	$25.00
801 Boards AS IS	$25.00
816 Boards AS IS	$25.00
802 Bare P.C. Boards	$5.00

No documentation available through us on the, 801, 802.

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RIBBON CABLE CONNECTORS:

	[1]24 M/F	[2]36 M/F	50 M/F
IDCEN Delta	6.50	7.50	8.50

	9S/P	15S/P	[3]25S/P	37S/P
IDB DSubminiature	3.25	3.75	6.00	8.50

	10	16	20	26	[4]34	40	[5]50	60
IDE CardEdge	3.00	3.00	3.00	4.00	4.25	4.50	4.50	8.00
IDS Socket	2.00	2.25	2.25	2.25	3.25	3.50	3.50	5.50
IDM Header	N/A	N/A	5.50	6.25	6.75	N/A	7.50	N/A

[1]IEEE488 • [2]Centronics Printers • [3]RS232 • [4]5¼" Drives • [5]8" Drives

SOLDER CUP "D" CONNECTORS:

9	15	25	37
2.25	2.50	2.75	3.50

DISKETTE PRICE LIST

TYPE	DYSAN PT#	PER BOX	10 OR MORE
8" S/S, Soft Sec., D/D	3740/1D	37.50	30.00
8" S/Sm 32 Hard Sec, D/D	101/1	37.50	30.00
8", Soft Sec, D/D	3740/2D	44.25	35.40
5¼" S/S, Soft Sec, D/D	104/1D	28.50	22.80
5¼" S/S, 10 Hard Sec, D/D	107/1D	28.50	22.80
5¼" D/S, Soft Sec, D/D	104/2D	38.25	30.60
5¼" D/S, 16 Hard Sec, D/D	107/2D	38.25	30.60
5¼" D/S, Quad D, 80 Track	204/2D	55.50	33.30

NOTE: All Diskettes come Ten (10) to a box. The box is a plastic library box. Quantity pricing: Ten boxes must be purchased but they may be mixed types.

STEPPER MOTORS:

24 vdc. with lead screw used for head positioning in Shugart 800/801. $7.50

I.C.'s:

Available for immediate delivery —

F-8	Single Chip Microcomputer		$1.00	SCN2652A	Signetics		15.00	MM 5204	EPROM		1.50
10101	1.00	10158	2.00	2708	1024x8 EPROM		2.50	MM 552D	analog switch		2.00
10102	1.00	10160	2.00	2716 450ns			3.50	MM 5314	Clock Circuit		4.50
10104	1.00	10161	2.00	2732A-3 300ns			5.00	MM 5316	Clock/Watch Circuit		4.50
10106	1.50	10162	2.00	2764 300ns			6.00	MM 5318	Clock Circuit		4.50
10107	1.50	10170	2.00	2758	1024x8 EPROM 54 only		3.50	MM 5330			6.00
10113	2.00	10172	2.00	2901	bit slice microprocessor		3.50	MM 5370			6.00
10117	2.00	10175	2.00	LM 304	Adjustable Neg. Volt. Reg.		1.50	MM 5375AA			4.50
10121	2.00	10176	2.00	CA 3075	FM dtector, lim., audio preamp		5.00	MM 5375AB			4.50
10130	2.00	10180	2.00	CA 3082	7Hi. Cur. NPN Transistors Com. Coll.		1.00	6522A	Periph. Interface Adapt.		6.00
10132	2.00	10182	2.00	LM 309H	+5V 200 ma. Voltage Regulator		1.50	6545A-1	CRT Controller		19.00
10133	2.00	10197	2.00	LM 310N	Linear Follower		1.50	6800-L	2.50	6845	12.00
10134	2.00	10212	2.00	LM 339	Linear Comparator Quad		1.00	6810	128x8 Static Ram		1.50
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TIL 111	Opto. Isolator		1.00	DS 3487	Four Three State 422/423 Receiver		3.00	74116	1.50	74LS189	8.00
1400S	16K Static 55ns.		4.00	4N26			1.00	74150	1.25	74LS244	2.00
TIL 156			1.00	4N37			1.00	74159	1.50	74LS259	2.50
AF 132CJ	Nat'l Modem Filters		5.00	MK4027N-3	4Kx1 200 NS		1.50	74181	2.00	74LS273	1.25
TD9 185030	32x8 Prom		2.50	TMS4045-20NL			4.00	74198	1.25	74LS299	1.50
1702	256x8 Ims EPROM		1.50	4164 200ns or Foster			3.75	74251	2.50	74LS366	.40
1793-02	floppy disk controller		18.00	RM 4136 DC	Quad Linear Op Amp		1.00	74390	1.00	74LS377	1.00
ULN2032A	Sprague		1.00	14412	11.00	14516 Harris	1.25	74C154	2.00	74LS379	1.00
2101-2	2.00	2104-4	2.00	4528	1.00	14539	1.50	74C193	.50	74S74	.50
21FO2	2.00	2108-2(A6L)	2.00	4529	1.00	14553B	5.00	74C89	4.00	74LS280	1.50
2104	2.00	2108-4	2.00	UCN 4810A	10 bit Fluorescent Dis. Driv.		2.00	74LS147	2.00	74S373	2.00
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C80186-3	8Mhz 16bit CPU		85.00
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81LS97	Octal 3 state buffer		1.25
8202	16.00	8237A-5	18.00
8212	1.00	8278	10.00
8216	1.50	8284A	5.00
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8253	6.50	82S123	2.50
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AM9517-5PC	DMA Controller		15.00
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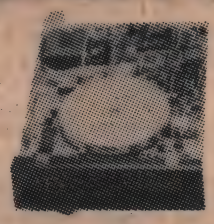

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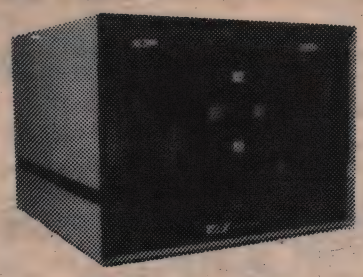

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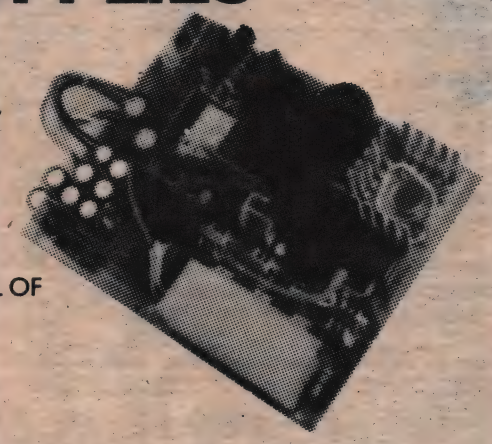

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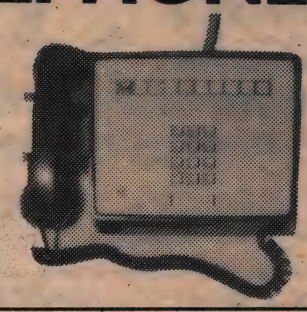

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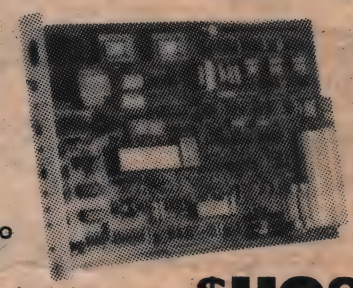

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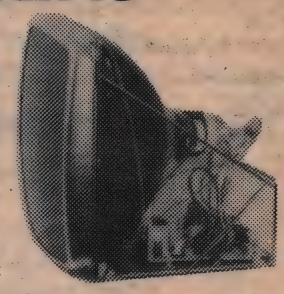

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NEEDED: MONITOR ROM for Intel MCS-80 System Design kit. Also Model 33 teletype. Write or call **Everett Thompson,** RFD #1 Box 61, LaGrange, ME 04453. 207-943-2102.

PUBLIC DOMAIN 5" $5SS/ $6DS/ $8Ipy. Librarys: CPMUG, SIGM, Piconet, IBMPC, Osborne, Zorba, CPM86. Sect-191 SoftFRMTS. SASE. VISA/MC. **Cramer,** Box 28606CS, Columbus, OH 43228-0606. 2-63

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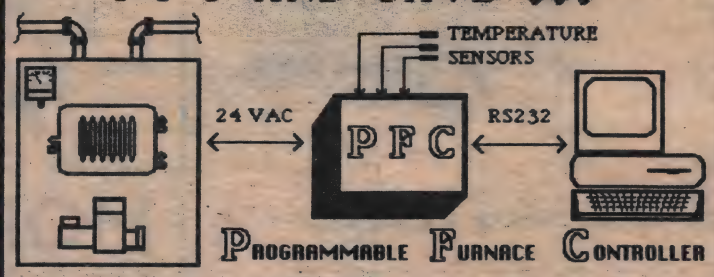

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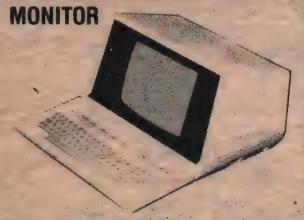

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IMSAI FRONT Panel $75. SIO-2 Serial Board, $60. N* SD Controller $50. Heathkit Dot Matrix Printer $120. **Randall Epperson,** PO Box 1098, Bryson City, NC 28713. 704-488-6180.

MORROW 20MBy S-100 Disk System: Discus M20 Hard Disk, HDCA-3 controller, 801 floppy, DJ-2D controller, power supply, case, documentation, software. $1250 - offer. Pick up only. 916-753-4632. 1-63

MORROW HDCA—3 $150, mint Morrow Disk Jockey 8" floppy controller with registrable CPM & documentation - $160, Morrow 24K memory - $40, Compupro disks and selector channel $200, Compupro disk $175. Prices negotiable. **Jim Hoffman,** 6909 Sylvan Glen, Citrus Heights, CA 95610.

S100 DOCUMENTATION - Complete user's manuals including schematics, layouts, parts lists, monitor listings for the following: *Digital Systems FDC 3-3 disk controller/HB 1.3 Bus interface; *Tarbell DD FD interface board; *Cromemco D+7A I/O D/A & A/D interface. *Micro systems design MF10-1 board; *SD Sales Z8800 CPU card; *SWTPC 6800 system notebook. $12 each or all for $65. **C. Pastore,** PO Box 701, Nesconset, New York 11767. 516-435-0222 (days). 1-61

S-100 HARDWARE: IMSAI SIO 2-2 $75, PIO 4-4 $75, VIO-C $150; Ithaca Audio Z80 CPU $75; SDS 64K DRAM $80; 18 slot mainframe $150; socketed. Manuals. Add-post. **Mark,** 602-437-1767.

S-100 MEMORY Quasar 64K Dynamic $200. Artek 32K static $150. Both with documentation, bank select, Phantom, and run at 4Mhz. Tarbell cassette board $50. **Chris Johnston,** 26481 Shirley Ave., Euclid, Ohio 44132. (216)731-3898. 2-62

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STROB PLOTTER with interface card, Microsoft fortran drivers, and complete doc. $375. Call **Victor Johansen,** 602-968-6411, 602-963-3943.

VECTOR BITSTREAMER I Board, 8 & 16K Vector static memory boards, Northstar and Micropolis dual disk systems, Misc. software. Good condition, price negotiable. **Warner Enterprises,** 816-358-1004.

WANTED CCS-2422 Bare board or A&T if reasonable. Sorcerer owners send $3 for Sorcerer Apprentice Newsletter sample. For sale - Micropolis dual drives, complete $400. **Tommy Stokes,** Rt. 1 Box 121, Everton, Ark. 72633.

(131) S-50 COMPATIBLE, PERIPHERAL

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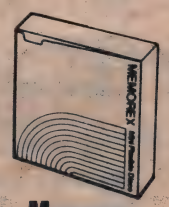

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3491-P	2.19
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6100-P	3.74

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F2D-S1024-P	2.89
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MF1D-P	2.99

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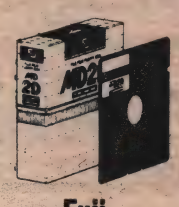

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800805-P	2.69
800803-P	3.14
800839-P	3.14
801187-P	1.94
802060-P	2.64
802067-P	3.99

Lifetime warranty
For more info on Dysan call
800-552-2211
In California 408-970-0860

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(132A) HEATH, SOFTWARE, PERIPHERAL

H8 Fig-Forth. '78 Standard, for tape systems. Load/dump applications. Implementation documentation, $25. **Fogsoft,** POB 7264, Fargo, ND 58103.

H-Z89 SOFTWARE Equation Plotter, Biorhythm Plotter, Banner, Basic listing program. Hard Sector HDOS and MBASIC req'd. Only $12.95 PP. **Mark James,** 6151 22 Ave. SW, Naples, FL 33999. 2-62

I ASSEMBLE and test kits for as little as $5 per kit. S-100 Heath and others. **505-772-5779. Stephen McCrary,** Box 127, Datil, NM 87821. 1-61

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★ ★ ★

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(134) HEWLETT PACKARD COMPUTERS FOR SALE

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The entire system is composed of a Hewlett-Packard 1,000 series Mainframe Computer/with 16 port unit and 28 modems, H-P 7970B tape drive, H-P 7906 disc drive, 25 Digital VT-100 w/keyboard video terminals, 7 Digital LA-36 DecWriter II Printers, 1 Digital LA-36 DecWriter II system console printer, 20 acoustic copulers/with cables.

HP-85A EX-COND. 32K, I/O ROM, A/P ROM, serial interface modem, software and manuals. $1200. 919-768-4571. **Paul J. Donadio,** 2830 Eddy Stone Ln., Winston-Salem, NC 27103. 2-62

HP-86A SYSTEM, $2500. Includes monitor, dual disc, HPIB, CPM-system, I/O-ROM, AP-ROM, Miksam, Ed-ROM, plus software. 201-751-5720, 201-864-4777. **Dennis Corbo,** 28 Liberty Ave., Belleville, NJ 07109.

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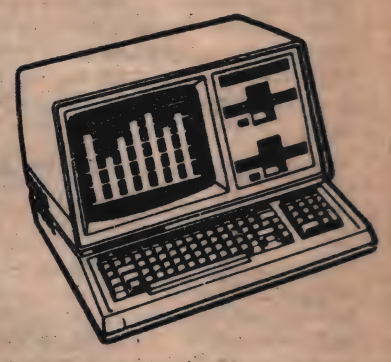

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LS01	.20	LS163	.45
LS02	.20	LS164	.65
LS03	.20	LS165	.90
LS04	.20	LS166	.99
LS05	.20	LS169	1.25
LS08	.20	LS174	.45
LS09	.20	LS175	.40
LS10	.20	LS181	1.50
LS11	.20	LS191	.90
LS12	.35	LS192	.80
LS13	.40	LS193	.80
LS14	.40	LS194	.65
LS15	.32	LS195	.60
LS20	.20	LS196	.70
LS21	.25	LS197	.85
LS27	.28	LS221	.65
LS30	.20	LS240	1.00
LS32	.25	LS241	.80
LS33	.40	LS242	1.00
LS37	.33	LS243	1.00
LS38	.30	LS244	1.00
LS42	.40	LS245	1.00
LS51	.24	LS251	.50
LS54	.25	LS253	.50
LS55	.24	LS257	.50
LS73	.35	LS258	.55
LS74	.30	LS259	2.00
LS85	.60	LS260	.50
LS86	.25	LS266	.40
LS90	.50	LS273	1.00
LS93	.55	LS279	.40
LS97	2.00	LS280	1.00
LS107	.37	LS283	.50
LS109	.25	LS290	.85
LS112	.30	LS293	.85
LS122	.45	LS298	.75
LS123	.55	LS299	1.60
LS124	2.75	LS323	2.60
LS125	.40	LS348	.75
LS126	.49	LS364	1.10
LS132	.50	LS366	.45
LS133	.35	LS367	.50
LS138	.45	LS368	.40
LS139	.40	LS373	1.00
LS151	.45	LS374	1.00
LS153	.50	LS375	.50
LS154	1.20	LS377	1.00
LS155	.50	LS378	.85
LS156	.50	LS390	1.00
LS157	.40	LS393	1.00
LS158	.50	LS399	1.25
LS160	.65	LS670	1.50
LS161	.50	25LS2569	3.00

TTL

7400	.22	74121	.27
7402	.22	74123	.40
7408	.24	74125	.49
7410	.19	74151	.50
7413	.33	74153	.50
7420	.22	74154	1.19
7425	.25	74157	.50
7427	.25	74160	.80
7428	.25	74162	.60
7432	.27	74163	.60
7433	.25	74164	.80
7440	.19	74165	.80
7442	.40	74166	1.00
7451	.20	74173	.75
7473	.34	74174	.85
7474	.40	74175	.80
7483	.45	74185	1.70
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7486	.30	74193	.80
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7493	.33	74273	1.75
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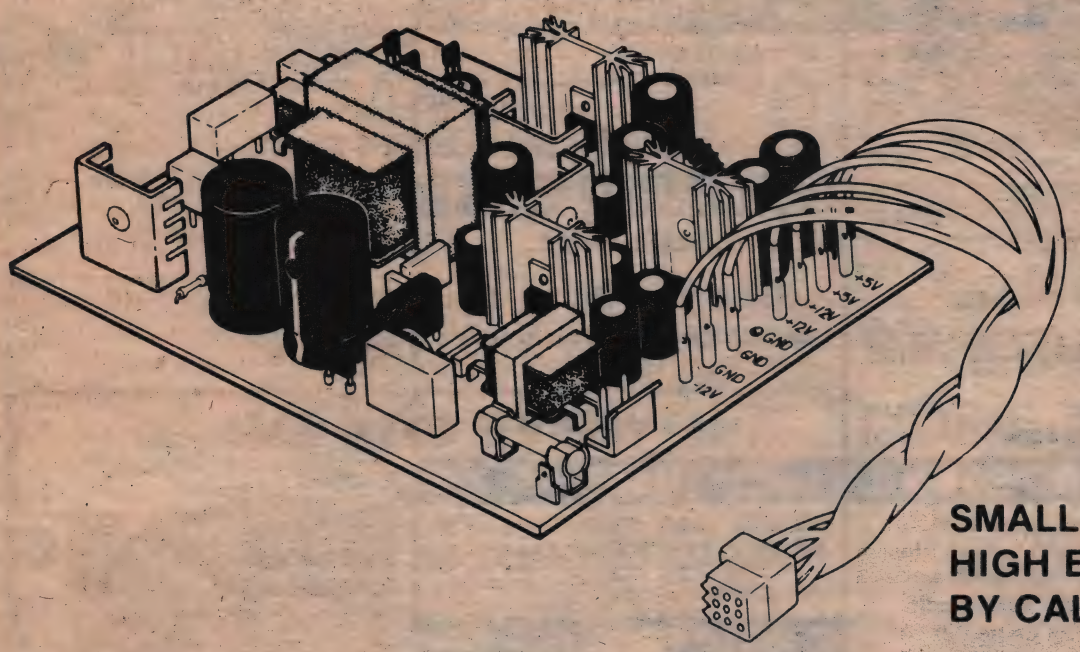

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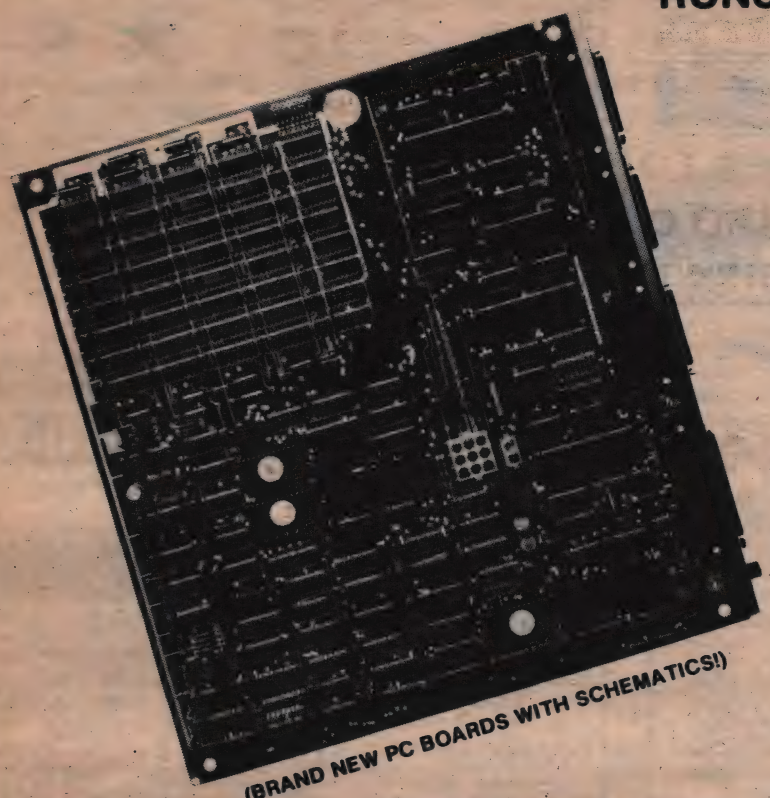

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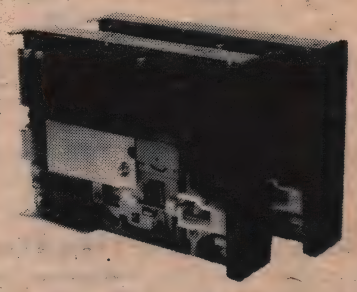

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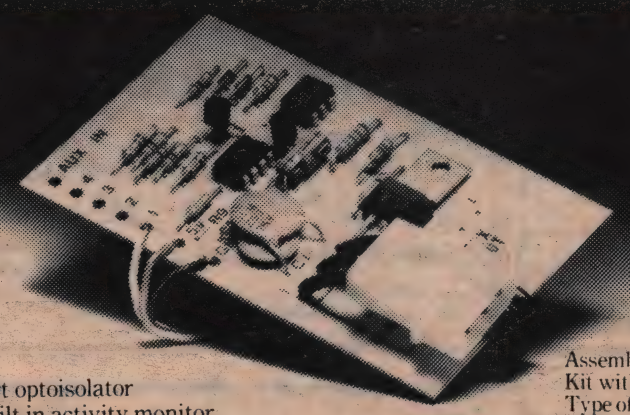

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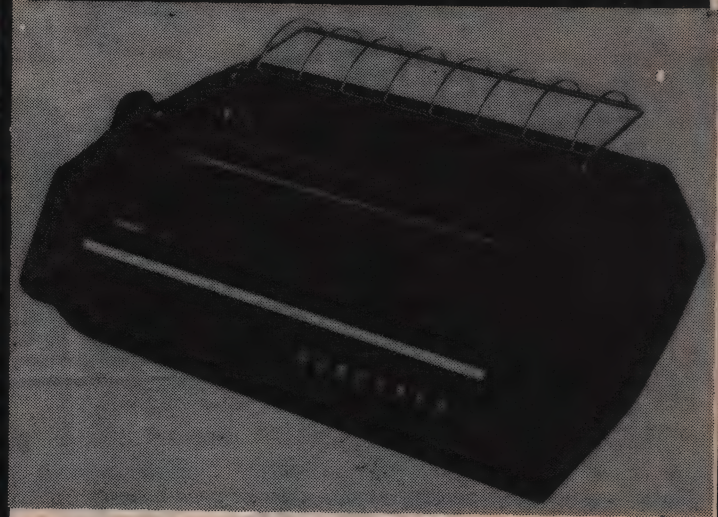

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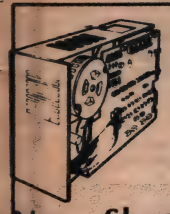

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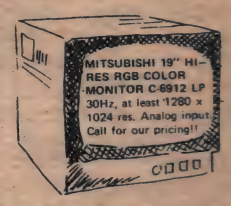

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(182) TERMINALS

BEEHIVE CRT's & parts for sale. Used and new. ATL004, 008, 083, 078, DM1S, DM20, DM30, DM3270, Micro B's, B100, B300, B400, B500, Super Bee II Cromemco 3102 & Cado Beehives Special, "Standard" used $550. **Mark,** 916-677-0355.1-67

BEEHIVE DM-5A Terminal, graphics capable. Green screen and detached keyboard. $400. **408-287-2961,** CA.

DATAMEDIA ELITE 1520 CRT Terminal RS-232, Printer Port, APL font in addition to standard ASCII, good cond. $225. **LEN, 212-777-4353.**

$$$$ Decwriter Three LA-120AA $1400. Like new. **Godfather's Used Computer Syndicate,** P.O. Box 3037, 1154 W. SR 436, Forest City, FL 32714. 305-774-1111. 1-61

GE CORRESPONDER 510 240 LPM Band Printer, Centronics Input (Serial available) Exc. Cond. Asking $1800. **LEN, 212-777-4353.**

HAZELTINE H1500 VDT - with operator's & maintenance manuals. Less than 30 hours on time. $300. **C. Pastore,** PO Box 701, Nesconset, New York 11767. 516-435-0222 (days). 1-61

HEATH H-19 25x80, B/W, 110-9600, numeric keypad, Z80 based, Heath and ANSI escape sequences. Make offer. **Chris,** 703-951-9030, 382-6423. 2-62

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QUME QUT102 Excellent, $425. Falco Data Products TSI, Good, $225. Zentec full function terminal, $225. Phone **415-651-0100** days, 415-656-0671 evenings. 2-62

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RADIO SHACK DT-1 DATA TERMINAL cat. #26-6050, 6 months old, mint condition, with manual, originally $699, asking $400. Two drive disk expansion bay cat. #26-4161, mint condition, asking $400. Radio Shack Modem II cat. #26-1173 fully programmable auto dial/ans with manual. Needs $20 repair, originally $249, asking $75. **Scott,** 718-439-8164.

TELEVIDEO 950 terminal, like new, perfect. With service manual, (a $50 value), cable, guaranteed. Runs reliably up to 19.2 kilobaud, in original carton, no scratches or phosphor burns, only $635, negotiable. **Neil,** 603-465-2788, evenings, weekends.

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(183) MULTIBUS BOARDS

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(184) MEMORY

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OKI MICROLINE 80 - 9x7 dot matrix, @35 cps, parallel, roll or pin feed paper, can use a tractor too. Make offer. **Chris,** 703-951-9030, 382-6423 EST.

(186) MODEMS

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MODEMS— Anchor Automation Mark XII 300/1200 baud with Hayes Smartmodem command structure: $240 plus $5 shipping (Illinois residents add $15 tax). **Overbeek Enterprises, Inc.,** P.O. Box 726, Elgin, IL 60121 or call 312-697-8420. 11-61

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(188) MISC. EQUIPMENT

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27128 $11, 2764 $5, 2732 $4, 2716 $2, 6845 $6, Z-80 CPU $2, 2114 $0.50, etc. "Pulls" tested and verified. Call for details. Much more! **Tupper Electronic Inc.,** 3003 N. Central 121-202, Phoenix, AZ 85012. 602-279-6437. 1-61

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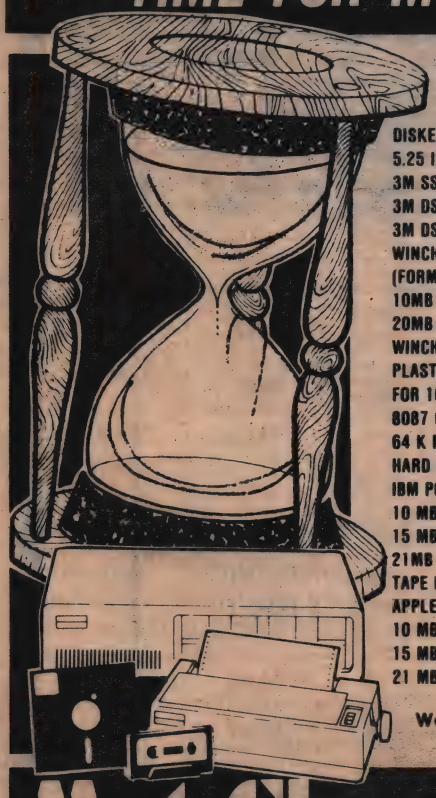

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(190) MISC. LARGE SYSTEMS

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(191) CP/M SOFTWARE

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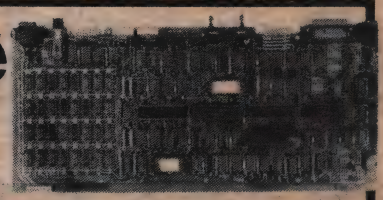

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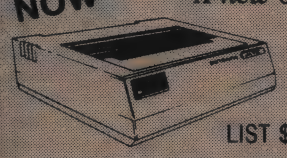

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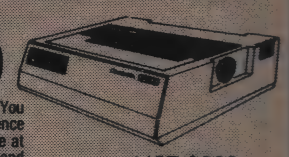

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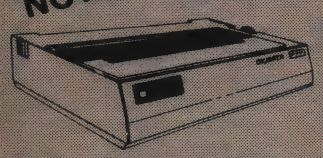

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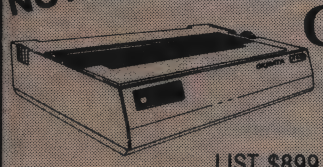

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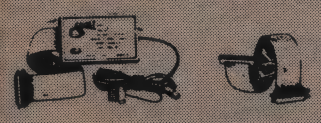

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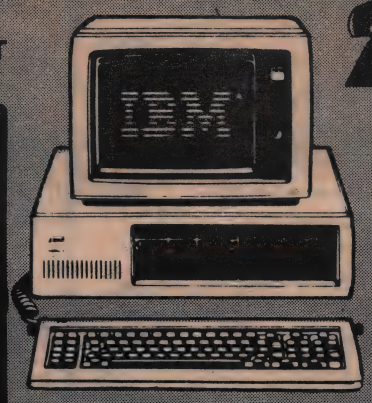

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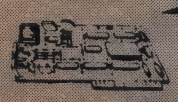

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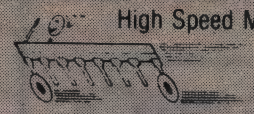

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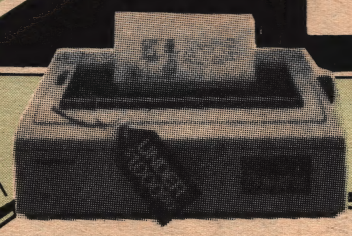

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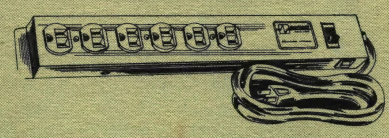

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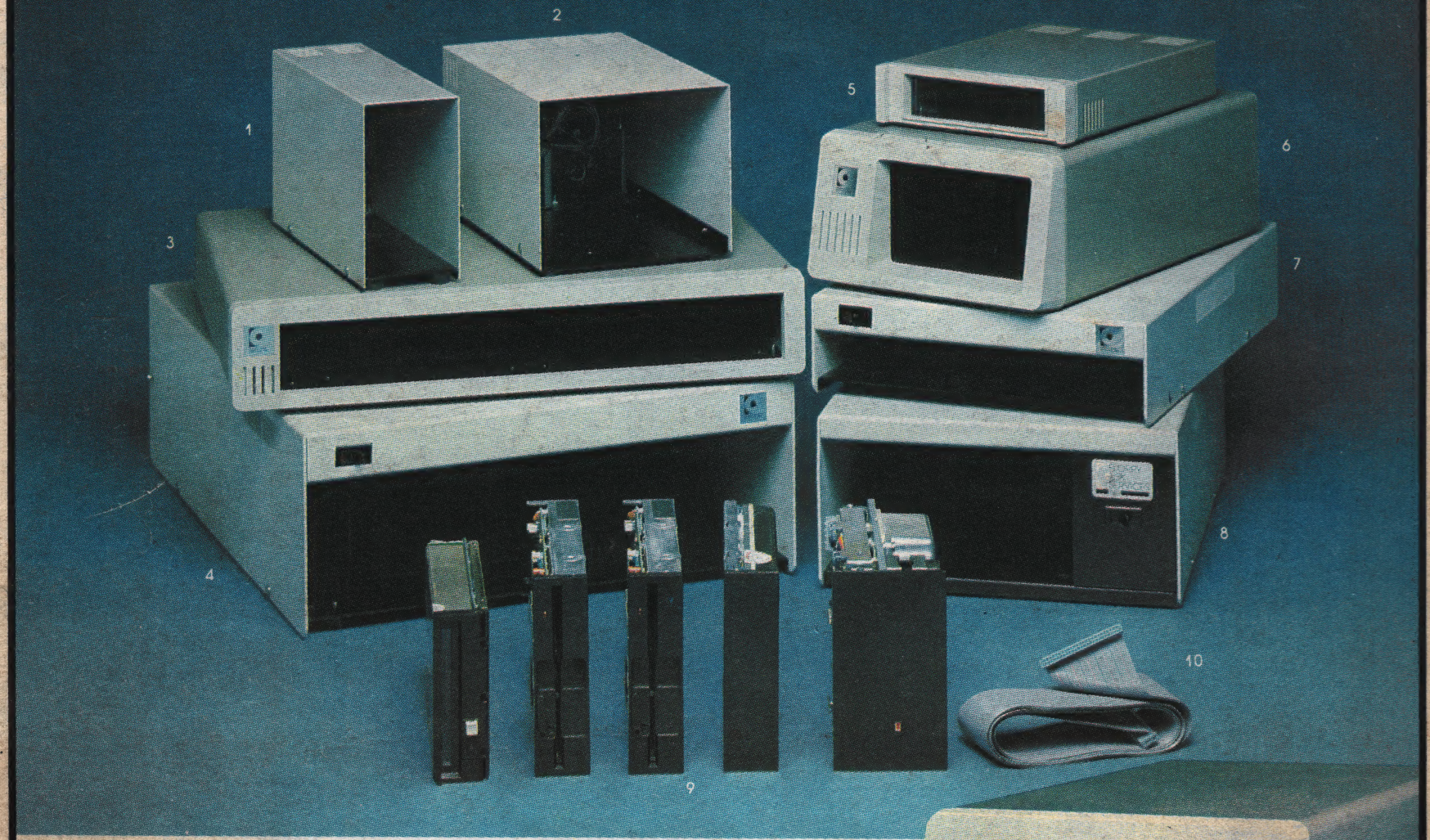

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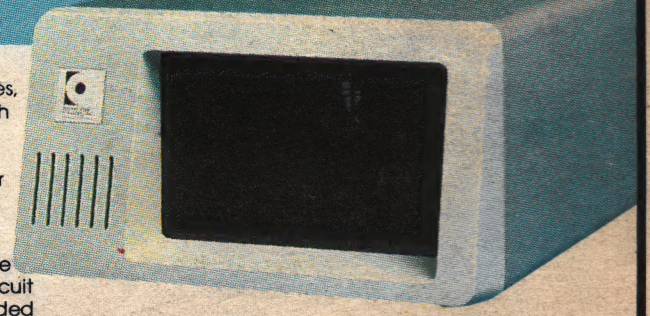

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